



PATENT

The Eclipse Group Docket No. HI09032USU (P03011US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DOCKET NO.: HI09032USU (P03011US)
INVENTOR: STEGE, Kurt
TITLE: NAVIGATION METHOD AND NAVIGATION SYSTEM
SERIAL NO.: 10/562,413
FILING DATE: Not Yet Entered
EXAMINER: Not Yet Assigned
GROUP ART UNIT: Not Yet Assigned
CONFIRMATION NO.: 5458

CERTIFICATE OF MAILING

I hereby certify that this correspondence (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, Mail Stop: Missing Parts, P.O. Box 1450, Alexandria, VA 22313-1450, on 7/25/11.

Diane Gilden
Diane Gilden

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

RENEWED PETITION UNDER 37 CFR 1.47(b)

Dear Commissioner:

This Renewed Petition under 37 CFR 1.47(b) is submitted in response to the Notice of Abandonment mailed January 5, 2009 and the Decision on Petition mailed from the USPTO on February 28, 2007.

07/26/2011 EFLORES 00000001 502542 10562413
01 FC:1463 200.00 DA

On or about July 6, 2009, our firm assumed responsibility for the subject file. In reviewing the transferred-in file, it came to our attention that the file went abandoned for non-

response of the Decision on Petition dated February 28, 2007. Because our client's intent was to maintain this application, we have enclosed the following documents:

1. Petition for Revival of an Application for Patent abandoned Unintentionally under 37 CFR 1.137(b);
2. Statement of Diane Gilden outlining the attempts made to transmit the application, drawings and formal documents to the last-known address of the non-signing inventor and Exhibits A-F evidencing the proof of delivery; and
3. Credit Card Authorization in the amount of \$1,820.00 (representing \$1,620.00 for the Petition for Revival of an Application for Patent Abandoned unintentionally under 37 CFR 1.137(b); and \$200.00 for the Renewed Petition as set forth in §1.17(g)).

Additionally, in accordance with 37 CFR 1.47(b) and Decision on Petition, it is requested that Petitioner provide proof of proprietary interest. Page 3, paragraph 2 of the Decision on Petition states, in part:

A proprietary interest obtained other than by assignment or agreement to assign may be demonstrated by an appropriate legal memorandum to the effect that a court of competent jurisdiction (federal, state, or foreign) would by the weight of authority in that jurisdiction award title of the invention to the 37 CFR 1.47(b) applicant.

Under German law, an invention to which an applicant is an inventor is one that is made during a period of employment. The employee must report an invention to the employer immediately in a separate written notice and provide the contents of the invention in detail. The employer must then immediately give the employee written confirmation in text form of receipt of the invention report, the German Claiming Letter, and all rights to the invention pass to the employer.

The PTO did not receive the following listed item(s) a credit card \$1820.00 only 8/16/2008

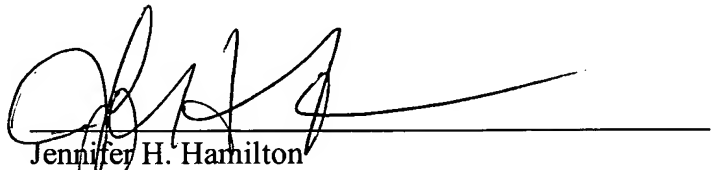
Applicant previously submitted a signed German Claiming Letter signed by inventor, Kurt Stege. The Office of Petitions inquired into whether the German Claiming Letter identified the connection to the above-identified U.S. application. As seen in the body of the executed German Claiming Letter by inventor Kurt Stege, the internal docket number of Harman Becker Automotive Systems GmbH, P03011US, is clearly listed in the center of the document. The German Claiming Letter was submitted along with an Affidavit of Facts in Support of Filing on behalf of Kurt Stege, signed by Dr. Tim Bast, the European Intellectual Property Counsel for Harman Becker Automotive Systems GmbH, a wholly owned subsidiary of Harman International Industries, Incorporated.

Therefore, it is believed that all conditions of the Petition under 37 CFR 1.47(b) have been met.

The Commissioner is authorized to charge any additional fees that may be required, or credit any overpayment, to our Deposit Account No. 50-2542. A copy of this sheet is enclosed.

Respectfully submitted,

Dated: 9/13/11



Jennifer H. Hamilton
The Eclipse Group LLP
6345 Balboa Blvd., Suite 325
Encino, CA 91316
(818) 488-8141 Telephone
(818) 332-4205 Fax
jhh@eclipsegrp.com

Customer No.: **34408**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

DOCKET NO.: HI09032USU (P03011US)
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Diane Gilden

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

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Applicant previously submitted a signed German Claiming Letter signed by inventor, Kurt Stege. The Office of Petitions inquired into whether the German Claiming Letter identified the connection to the above-identified U.S. application. As seen in the body of the executed German Claiming Letter by inventor Kurt Stege, the internal docket number of Harman Becker Automotive Systems GmbH, P03011US, is clearly listed in the center of the document. The German Claiming Letter was submitted along with an Affidavit of Facts in Support of Filing on behalf of Kurt Stege, signed by Dr. Tim Bast, the European Intellectual Property Counsel for Harman Becker Automotive Systems GmbH, a wholly owned subsidiary of Harman International Industries, Incorporated.


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Respectfully submitted,

Dated: _____

9/13/11



Jennifer H. Hamilton
The Eclipse Group LLP
6345 Balboa Blvd., Suite 325
Encino, CA 91316
(818) 488-8141 Telephone
(818) 332-4205 Fax
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PATENT
Docket No. HI09032USU (P03011US)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Diane Gilden
Diane Gilden

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313

Dear Sir:

I, Diane Gilden, submit this declaration in support of the Renewed Petition under 37 CFR 1.47(a), Notice of Abandonment mailed January 5, 2009 and the Decision on Petition mailed from the USPTO on February 28, 2007.

1. I am the Senior Intellectual Property Paralegal at The Eclipse Group LLP.
2. Kurt Stege (the "Inventor") was employed by Harman Becker Automotive Systems GmbH on February 1, 1996, and is a joint inventor in the subject application.

3. Inventor Kurt Stege left his employment with Harman Becker Automotive Systems GmbH on June 30, 2005 at which time his last-known address was Habichsweg 4, Hamburg, Germany 22307. No email address, other than the Harman Becker Automotive Systems GmbH email address, has been known.

4. On June 7, 2010, a letter transmitting the Combined Declaration and Power of Attorney and copy of the application as filed with the USPTO was sent to inventor Kurt Stege via International Express Mail (Exhibit A).

5. As evidenced by the United States Postal Track & Confirm printout dated June 28, 2010, the International Express Mail package was delivered to inventor Kurt Stege on June 15, 2010 at 12:30pm, (Exhibit B).

6. Because the signed Combined Declaration and Power of Attorney was not received, a reminder letter forwarding the Combined Declaration and Power of Attorney and copy of the application as filed with the USPTO was again sent to inventor Kurt Stege via International Express Mail on June 29, 2010, (Exhibit C).

7. As evidenced by the United States Postal Track & Confirm printout dated July 29, 2010, delivery of the International Express Mail package was attempted to be delivered to inventor Kurt Stege on July 6, 2010 at 3:15pm (Exhibit D).

8. On June 23, 2010, the International Express Mail package that was attempted to be delivered to inventor Kurt Stege on June 7, 2010, and was sent back to our firm via DHL Courier (Exhibit E).

9. On July 7, 2010, the International Express Mail package that was attempted to be delivered to inventor Kurt Stege on June 29, 2010, and was sent back to our firm via DHL Courier (Exhibit F).

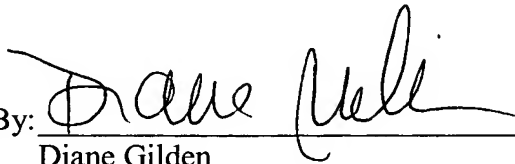
10. As of this date, I have not received the signed documents after two attempts have been made and consider that all means to contact the inventor have been exhausted.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: _____

7/13/11

By: _____



Diane Gilden
The Eclipse Group LLP
6345 Balboa Blvd., Suite 325
Encino, CA 91316
(818) 488-8144 Tel
(818) 332-4205 Fax
dsg@eclipsegrp.com

EXHIBIT A

June 7, 2010

H766805847US

VIA EXPRESS MAIL
LABEL #EH 766805847 US

Mr. Kurt Stege
Habichtsweg 4
Hamburg, Germany 22307

Re: Harman Becker Automotive Systems GmbH
U.S. Patent Application Serial No. 10/562,413
(based on PCT/EP2004/006991 filed June 28, 2004)
Title: NAVIGATION METHOD AND NAVIGATION SYSTEM
Inventor: STEGE, Kurt
The Eclipse Group Docket No. HI09032USU (P03011US)

Subject: Transmitting Application and Formal Documents

Dear Mr. Stege:

We are intellectual property counsel for Harman Becker Automotive Systems GmbH ("Harman"). We understand that you were employed by Harman at the time the above-identified application was filed with the USPTO and that you were named as an inventor.

In accordance with your employment with Harman, we understand that you acknowledge Harman's ownership of your work product in connection with the NAVIGATION METHOD AND NAVIGATION SYSTEM that is the subject of the attached application.

We have attached a Combined Declaration and Power of Attorney for signature recognizing you as an inventor and Harman as the owner of the associated patent rights. The Combined Declaration and Power of Attorney declares you as an inventor and provides our firm with the authority to prosecute the application on behalf of Harman.

We have also attached the following documents for your files:

1. Copy of Claiming Letter; and
2. Copy of the application as filed with the USPTO.

The Claiming Letter verifies that through your employment with Harman, all rights to the work product have been assigned to Harman.

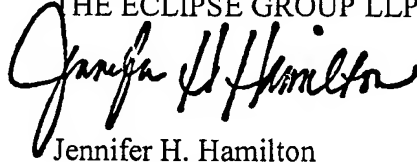
Jennifer H. Hamilton | t: 818.488.8141
10605 Balboa Blvd., Suite 300 | f: 818.332-4205
Granada Hills, California 91344 | jhh@eclipsegrp.com

We would appreciate it if you would please sign, date and fax back the documents to us at (818) 332-4205 **no later than Monday, June 28, 2010**. Alternatively, if, for any reason, you refuse to sign these documents, we kindly ask that you notify us in writing of such refusal by email at jhh@eclipsegrp.com, along with an explanation as to why you refuse to sign.

Please let us know if you have any questions.

Sincerely,

THE ECLIPSE GROUP LLP



Jennifer H. Hamilton

JHH/dg
Enclosures

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below-named inventor, I hereby declare that:

1. My residence, post office address, and citizenship are as stated below next to my name.
2. I believe I am an original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention titled:

NAVIGATION METHOD AND NAVIGATION SYSTEM

the specification of which (check one):

- ☐ is attached hereto.
- ☒ was filed on: June 28, 2004
as International Application No.: PCT/EP2004/06991
- ☐ and was amended on: _____

3. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

4. I acknowledge the duty to disclose information which is material to patentability as described in 37 C.F.R. 1.56, which is defined on the attached page.

5. I hereby claim foreign priority benefits under 35 U.S.C. 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

| | | | | |
|---------------------|-----------|------------------------|-------------------------------------|--------------------------|
| <u>03 014 760.7</u> | <u>EP</u> | <u>27 June 2003</u> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (Number) | (Country) | (Day/Month/Year Filed) | Yes | No |

6. I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56, which is defined on the attached page, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior United States Application(s)

| | | |
|--------------------------|----------------------|-----------------------------------------|
| <u>PCT/EP2004/006991</u> | <u>June 28, 2004</u> | <u>Abandoned</u> |
| (Application Serial No.) | (Filing Date) | (Status)-(patented, pending, abandoned) |

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

8. I hereby appoint the following attorneys, and all attorneys associated with **Customer No. 34408** for The Eclipse Group LLP, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office in connection with this application and

Robert P. Hart, Reg. No. 35,184
Corporate Counsel
Harman International Industries, Incorporated
8500 Balboa Blvd.
Northridge, CA 91329

Please direct all correspondence to:

Customer No. 34408

Please direct telephone calls to Jennifer H. Hamilton at (818) 488-8141 (facsimile (818) 332-4205)).

Full name of first sole inventor: Kurt Stege

Signature of inventor: _____

Date: _____

Residence and Post Office Address: Habichtsweg 4
Hamburg, Germany 22307

Citizenship: German

Section 1.56 Duty to Disclose Information Material to Patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

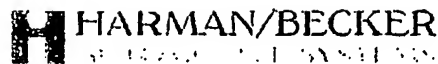
(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

EINGANG 13 JAN. 2003



HARMAN/BECKER Automotive Systems GmbH Postfach 71 72 (D-76307) Karlsbad

Telefon +49 (0) 72 48 / 71 - 1341
Fax +49 (0) 72 48 / 71 - 1379
e-mail: Jspindler@becker.de
internet: www.becker.de

Herr
Steg, Kurt
Werk Karlsbad
Im Stöckmühle 1
D-76307 Karlsbad

Ihr Zeichen

Unser Zeichen: P&L-SP

Datum: Karlsbad, 12.12.2002

Invention Disclosure No. (Erfindungsmeldung Nr.): P03011

Date of Receipt (Eingangsdatum): 28.08.2002

Title:

Dynamische Fahrempfehlung

Dear Mr. Steg

HARMAN/BECKER Automotive Systems (Becker Division) GmbH, herewith refers to your above mentioned invention and declares to you unlimited proprietary claims in accordance with § 6 of the German Law regulating employee inventions.

HARMAN/BECKER Automotive Systems (Becker Division) GmbH bezieht sich hiermit auf Ihre o.g. Erfindung und erklärt, diese unbeschränkt in Anspruch zu nehmen gemäß § 6 des Gesetzes über Arbeitnehmererfindungen.

Yours sincerely

**HARMAN/BECKER Automotive Systems
(Becker Division) GmbH**

Dr. T. Bast
(P&L)

2002-01-07 K&A C&G

.....
Date and Signature of Inventor
(Datum und Unterschrift des Erfinders)

Co-Inventor (Miterfinder): keine

IP4 Rec'd PCT/PTO 23 DEC 2005

"Express Mail" mailing label number
EV 316043007 US

Date of Deposit December 23, 2005

| | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371 | | ATTORNEY'S DOCKET NO. 11336.1236 (P03011US) U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5) 10/562413 |
| INTERNATIONAL APPLICATION NO. PCT/EP2004/006991 | INTERNATIONAL FILING DATE June 28, 2004 | PRIORITY DATE CLAIMED June 27, 2003 |
| TITLE OF INVENTION NAVIGATION METHOD AND NAVIGATION SYSTEM | | |
| APPLICANT(S) FOR DO/EO/US KURT STEGE | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | |
| 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9), and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)). a. <input checked="" type="checkbox"/> Is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English translation of the International Application into English (35 U.S.C. 371(c)(2)). a. <input type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)) and/or amendments under Article 34. | | |
| Items 11 to 20 Below concern other document(s) or information included: | | |
| 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A preliminary amendment. 14. <input type="checkbox"/> An Application Data Sheet under 37 CFR 1.76. 15. <input type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A power of attorney and/or change of address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821-1.825. 18. <input type="checkbox"/> A second copy of the published International application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 20. <input checked="" type="checkbox"/> Other items or information: Return Post card. | | |

SEND COMPLETED FORM TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

LAP9 Rec'd PCT/PTO 23 DEC 2009

| U.S. APPLICATION NO. 10/562413 <small>(If form, see 37 CFR 1.52)</small> | | INTERNATIONAL APPLICATION NO. | | ATTORNEY'S DOCKET NO. | | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|------|--------------|----------|---|------------|--------------------|--------|---|-------------|--------------------------------------------|--|--|------------|-------------------------------|--|--|--------|--|--|
| The following fees are submitted: 21. <input checked="" type="checkbox"/> Basic national fee (37 CFR 1.492(a))\$300 22. <input checked="" type="checkbox"/> Examination fee (37 CFR 1.492(c)) If International preliminary report prepared by ISA/US or the examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)\$0 All other situations\$200 23. <input checked="" type="checkbox"/> Search Fee (37 CFR 1.492(b)) If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)\$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority\$100 International Search Report prepared and provided to the Office\$400 All other situations\$500 <div style="text-align: right;">TOTAL OF 21, 22 and 23 = \$1000</div> <input type="checkbox"/> Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is \$250 for each additional 50 sheets of paper or fraction thereof. Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | CALCULATIONS PTO USE ONLY | | | | | | | | | | | | | | | | | | | | | |
| | | | | \$1000 | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Claims</th> <th style="width: 25%;">Number Filed</th> <th style="width: 25%;">Number Extra</th> <th style="width: 25%;">Rate</th> </tr> </thead> <tbody> <tr> <td>Total Claims</td> <td style="text-align: center;">20- 20 =</td> <td style="text-align: center;">0</td> <td style="text-align: right;">x \$ 50.00</td> </tr> <tr> <td>Independent Claims</td> <td style="text-align: center;">1- 3 =</td> <td style="text-align: center;">0</td> <td style="text-align: right;">x \$ 200.00</td> </tr> <tr> <td>Multiple dependent claim(s) if Applicable)</td> <td></td> <td></td> <td style="text-align: right;">+ \$360.00</td> </tr> <tr> <td colspan="3" style="text-align: right;">TOTAL OF ABOVE CALCULATIONS =</td> <td style="text-align: right;">\$1000</td> </tr> </tbody> </table> | | | | Claims | Number Filed | Number Extra | Rate | Total Claims | 20- 20 = | 0 | x \$ 50.00 | Independent Claims | 1- 3 = | 0 | x \$ 200.00 | Multiple dependent claim(s) if Applicable) | | | + \$360.00 | TOTAL OF ABOVE CALCULATIONS = | | | \$1000 | | |
| Claims | Number Filed | Number Extra | Rate | | | | | | | | | | | | | | | | | | | | | | |
| Total Claims | 20- 20 = | 0 | x \$ 50.00 | | | | | | | | | | | | | | | | | | | | | | |
| Independent Claims | 1- 3 = | 0 | x \$ 200.00 | | | | | | | | | | | | | | | | | | | | | | |
| Multiple dependent claim(s) if Applicable) | | | + \$360.00 | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL OF ABOVE CALCULATIONS = | | | \$1000 | | | | | | | | | | | | | | | | | | | | | | |
| <input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. | | | | | | | | | | | | | | | | | | | | | | | | | |
| SUBTOTAL = | | | | \$1000 | | | | | | | | | | | | | | | | | | | | | |
| Processing fee of \$130.00 for furnishing the English translation later than the <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | \$ | | | | | | | | | | | | | | | | | | | | | |
| TOTAL NATIONAL FEE= | | | | \$1000 | | | | | | | | | | | | | | | | | | | | | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31), \$40.00 per property + | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL FEES ENCLOSED= | | | | \$1000 | | | | | | | | | | | | | | | | | | | | | |
| | | | | Amount to be refunded \$ | | | | | | | | | | | | | | | | | | | | | |
| | | | | charged \$ | | | | | | | | | | | | | | | | | | | | | |
| a. <input type="checkbox"/> A check in the amount of \$_____ to cover the above fees is enclosed. b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. 23-1925 in the amount of \$1000 to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. | | | | | | | | | | | | | | | | | | | | | | | | | |
| NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status. | | | | | | | | | | | | | | | | | | | | | | | | | |
| Send All Correspondence to: <div style="text-align: center;"> Brinks Hofer Gilson & Lione P.O. Box 10395 Chicago, IL 60610 </div> | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | <div style="text-align: center;"> Signature </div> <div style="text-align: center;"> Name Jason M. Wejnert Registration Number 55,722 </div> | | | | | | | | | | | | | | | | | | | | | |

Navigation method and Navigation system

The invention relates to a method and a navigation system to assist navigation, in particular, in regions the user of the navigation system is relatively well familiar with.

Since the outcome of satellite navigation data, navigation systems, especially for cars, are getting more and more used. Usually those navigation systems receive position data from a device based on the global positioning system (GPS) technology.

The navigation systems are most commonly used in cases for which the user of the navigation system is not familiar with the area he is travelling in or travelling to. The user then communicates the destination he wants to reach to the system and eventually also enters further waypoints to which he wants to travel on his way to his final destination. A waypoint is a navigation point, characterized by its coordinates which is determined either by the user or the system. Based on a digitized map, which comprises road information for the area the user is interested in, the navigation system calculates a route, being a succession of waypoints, and assists the user in finding the right way to the waypoints and the final destination. For instance, in the case of a car navigation system, the navigation system tells the driver which road he should drive on and where he has to change onto another road. For this the navigation system employs means to provide the information in a graphical way, but also assists with acoustic information.

Today's navigation systems typically provide three operation modes. Firstly, the acoustical and optical guidance, secondly, optical guidance only and thirdly, no guidance. None of the three operation modes is however suited to be used in areas the user of the navigation system is familiar with. As the user usually knows where to go and how to reach the destination, mode 1 is not suitable as the user receives too much navigation information and he is especially not interested in acoustic announcements. This disadvantage is not present in the second mode. In this case, however, navigation information could still be interesting for the user as, for example, a traffic jam or road constructions may be present on the route that the user usually takes. Then, only providing optical guidance is not sufficient, as the chance is very high that the user will not read the warnings that are provided by the navigation system and, therefore, he will end up in the traffic jam. It is evident that also the third mode is not suited, as no information is provided at all.

Fig. 4 shows a typical navigation method as used in navigation systems according to the prior art. After starting up the navigation system, step 400 consists in inputting data into the navigation system. This data comprises a digitized map that is uploaded into a memory of the navigation system and at least the final destination waypoint. A second waypoint, usually the starting waypoint, is needed to be able to calculate a route and can either be manually provided by the user or be provided automatically by a positioning system. Step 401 then consists in calculating a route based on the input data. To calculate this route, the system may use further predetermined values which in step 402 have either been input manually by the user or consist of default settings. These predetermined values may contain certain parameters on how to calculate a route, for example, if the user wishes to find the shortest possible way from the starting point to the final destination waypoint or the fastest route, or on how to output the navigation information, generated in step 402. The system may also use further information concerning, for example, traffic jams to calculate a route. Usually this kind of information is received via radio and input into the navigation system.

In step 403, the method consists in checking whether a position has been reached on the route for which navigation information has been produced by the navigation system. If this is not the case, step 403 is repeated until such a position is reached. If a position for which navigation information has been produced is reached, the corresponding navigation information is output in step 404. The navigation information is then shown on a screen and/or acoustically announced. Step 405 consists in checking whether the final destination waypoint has been reached. If this is the case, the navigation method ends. If this is not the case, the method proceeds with step 406, wherein the navigation system checks whether new updated information, about traffic jams for example, is available to the system. If this is the case, the method proceeds with step 401 in which a new route is calculated based on the newly available information. If this is not the case, the process continues with step 403.

In such a prior art system, when a new route is calculated, due to updated road information, the old route is overwritten and a comparison of the new and old route is not possible, neither for the user nor for the navigation system. This is in particular disadvantageous for cases in which the amount of navigation information given for the old and the new route shall differ.

It is therefore the object of this invention to provide a method to assist navigation and to provide a navigation system which overcomes the above stated problems and further enhances the comfort of navigation assistance.

This object is achieved by the method according to claim 1 and the navigation system according to claim 14.

Accordingly, a method to assist navigation is provided comprising the steps of:

providing a digitized map,

determining a static route based on at least two waypoints and static road information from the digitized map or by uploading a route,

determining a dynamic route based on static road information from the digitised map and dynamic information, and

outputting navigation information.

The user can provide a navigation system, using the inventive navigation method, with at least two waypoints, for example, a starting waypoint and a final destination waypoint. Alternatively a positioning system can provide the starting point, being the current position, and - based on this information together with road information from the provided digital map - the navigation system can compute the so-called static route which is one possible way to go from the one waypoint to the other and which is described as a succession of waypoints. Depending on predetermined parameters, either predetermined by the system or by the user, different static routes can be obtained, like for example the fastest route or the shortest route. As an alternative, the static route could also be uploaded into the navigation system from a storage medium. The static route represents, for example, a route which the user regularly travels on, like the daily way from home to work and back. However the calculation does not take into account any information which may be variable in time.

In contrast thereto a second route, the dynamic route, is determined which, in addition to the waypoints and the road information, also takes into account dynamic information comprising, amongst others, traffic jam information, construction work information, closed road information and/or weather information. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may be also changing in time. Depending on the current situation, the determined dynamic route may therefore be different from the static route. In this way, both a static and a dynamic route are determined and present. Depending on the way the navigation system is configured, it is then possible to output the obtained navigation data either about the static route or the dynamic route. Thus, the navigation method according to invention may provide the necessary navigation information also in a situation in which the user is familiar with the roads he is travelling on, as either the more complete navigation information of the dynamic route or the reduced information set of the static route can be communicated to the user.

A preferred embodiment of the method can comprise the steps of comparing the static route and the dynamic route, and outputting dynamic route navigation information if the static route and the dynamic route are different.

In particular, at the moment the dynamic route is determined, the user is informed that on his usual route, which corresponds to the static route, a problem may currently be present which might lead to a longer travelling time and therefore the alternative, the dynamic route, can be proposed. Then the user knows right from the start that it might be advantageous to follow the proposed dynamic route.

According to an advantageous embodiment, the method can further comprise the step of formatting the navigation information output differently for the static route navigation information and for the dynamic route navigation information, whereby the formatting step precedes the navigation information outputting step. This means that the inventive method provides the possibility that the amount of information and the way the information is given may be different depending on whether the static route or the dynamic route is followed, thereby further improving the comfort of the navigation system.

In a particular advantageous embodiment of the method, navigation information for the static can be not output or only output optically and navigation information for the dynamic route can be output acoustically.

This means, when the user is moving on the static route, e.g. a road he is familiar with, he is not overloaded with acoustical navigation information which he does not need anyway. If static navigation is not at all output, a screen, the navigation system is using, may be used for different applications like information about the radio stations or the like. However, in the case that due to a dynamic event, the navigation system proposes to now follow the dynamic route, it becomes important that the information is provided acoustically so that it is ensured that the user receives the necessary navigation information at the time he needs an update about the situation. Optionally navigation information concerning the dynamic route could also be output in an optical way on a screen.

In a preferred embodiment, the inventive method can further comprise the step of determining current position data. It is particularly interesting for the user to know exactly where he is situated. The current position can, for example, be shown on the screen of the navigation system.

According to a further preferred embodiment, the dynamic route can be re-determined on a regular basis and/or when new dynamic information is provided to the navigation system and/or if the current position is neither on the previously determined dynamic route nor on the static route. By providing this update concerning the dynamic route, it can be ensured that changing situations are taken into account. This is particularly important when a previously announced traffic jam has disappeared so that the user should not follow the previously determined dynamic route but can continue to follow the static route. The static route, however, might be the same as the newly determined dynamic route. Of particular importance is also the situation in which the user erroneously or purposely quits both the static route and the dynamic route. In this case, the previously determined dynamic route is no longer valid and, to be able to assist the user, it becomes necessary to re-determine a new dynamic route based on the new circumstances.

In a further variant of the method, the dynamic route can, when the current position is neither on the previously determined dynamic route nor on the static route, be re-determined such that the re-determined dynamic route and the static route have more than one waypoint in common. The user might not be interested in a newly determined dynamic route which only takes into account the final destination waypoint, but it could be that the user wants to return back to the static route as quickly as possible or in the shortest way. However, also in this case, the dynamic route determination still takes into account dynamic information.

In a further preferred embodiment, the method can further comprise the step of outputting static route navigation information if the navigation system is on the static route and providing dynamic route navigation information if the navigation system is on the dynamic route but not on the static route. If the user knows the area he is driving in and follows a route corresponding to the static route, he might not be interested in receiving too much navigation information. However, as soon as he decides to leave the static route to follow a dynamic route he might need to receive more information than usual. This ensures an enhanced comfort of the navigation method.

In a further variant, the inventive method can comprise the step of comparing a following manoeuvre step of the static route and the following manoeuvre step of the dynamic route, if the current position data corresponds to a waypoint on both the static and the dynamic route, and outputting dynamic route navigation information about the following manoeuvre step, if the manoeuvre steps are different. The manoeuvre step actually contains the description on how to reach a next waypoint of a route. This additional method step brings the advantage that even while the user is travelling on the static route he nevertheless receives additional information should the following step on the static and dynamic routes be different. Thus, at the right moment, the user can make a decision whether to follow the usual static route or to follow the guidance advice of the navigation system, resulting in a further enhanced comfort of the navigation system.

According to another preferred embodiment, at least one of the steps of determining the static and/or the dynamic route can be performed on request. This step is of particular interest in the case that the user has decided to follow the advice of the navigation system to quit the static route and follow the dynamic route. In the case of the user being familiar with the proposed dynamic route, it is advantageous that he has the choice

to decide that the dynamic route should be treated as a static route and thus the user will not receive too much navigation information. In addition this step is also of particular interest in the case that the user is positioned outside the static route and that the user wants the navigation system to determine a new static route, thus not taking into account dynamic information. The request from the user can be transmitted to the navigation system using, for example, a special button or a soft-key on the man machine interface or a speech recognition functionality. By providing these additional possibilities, the use of the navigation system is further rendered more comfortable.

Preferably, the navigation systems can provide an output, in particular an acoustic output, when the navigation system detects that a predetermined criterion is fulfilled. Especially in the case that the navigation system detects that the current position is not on the static route, as one example of a predetermined criterion, the navigation system could propose to the user to determine new route data leading perhaps to different static and/or dynamic routes, which the user could follow. It is then up to the user whether he wants to follow the advice or not and request that a new route, static and/or dynamic, is determined.

A further variant of the invention can comprise the further step of storing the static route on a non-volatile memory. Thus, the user can decide whether the route he is currently travelling on is one in which he will be interested in in the future. Therefore, it is advantageous to be able to store this route on a volatile memory on which, for example, other static routes could already be stored. Storing media may include CD ROMS, floppy disks, hard disks or any other kind of non-volatile memory.

The invention further provides a computer program product directly loadable into the internal memory of a digital computer comprising software code portions for performing the steps of one of the methods described above.

The invention also provides a computer program product stored on a medium readable by a computer system comprising computer-readable programme means for causing a computer to perform the steps of one of the previously described methods.

Furthermore, the invention provides the use of one of the methods as described above in a navigation system mounted in a vehicle, in particular, a car.

In addition, the invention provides a navigation system, in particular for performing one of the previously described methods, comprising:

input means for inputting data,

data storage means for storing data, in particular a digitized map,

dynamic information receiving means for receiving dynamic information data,

data processing means for providing navigation information,

outputting means for outputting navigation information, in particular optical and acoustical means,

wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map or by uploading a route and a dynamic route is determined based on static road information from the digitized map and dynamic information.

The user can provide the navigation system with at least two waypoints, like a starting waypoint and a final destination waypoint. Alternatively, a positioning system can provide a starting point, being the current position, and - based on this information together with road information from the provided digitized map - the navigation system can compute the so-called static route which is one possible way to go from the one waypoint to the other and which is described as a succession of waypoints. Depending on predetermined parameters, either predetermined by the system or by the user, different static routes can be obtained, like for example the fastest route or the shortest route. As an alternative, the static route could also be uploaded into the navigation system from a storage medium. The static route represents, for example, a route which the user regularly travels on, like the daily way from home to work and back. In any case, the determination of the static route does not take into account any information which may be variable in time.

In contrast thereto, the navigation system determines a second route, the dynamic route, which in addition to the static information such as waypoints and the road information,

also takes into account dynamic information comprising, amongst others, traffic jam information, construction work information, closed road information and/or weather information. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may be also changing in time. Depending on the current situation the determined dynamic route may therefore be different from the static route. In this way, both a static and a dynamic route are determined and present. Depending on the way the navigation system is configured, it is then possible to output the obtained navigation data either about the static route or the dynamic route. Thus, the navigation system according to the invention may provide the necessary navigation information also in a situation in which the user is familiar with the roads he is travelling on, as either the more complete navigation information of the dynamic route or the reduced information set of the static route can be communicated to the user.

In a further preferred embodiment, the navigation system can further comprise formatting means being designed to format the output of the navigation different for the static route and the dynamic route. This means that the navigation system gives the possibility that the amount of information and the way the information is given may be different depending on whether the static route or the dynamic route is followed, thereby further improving the comfort of the navigation system. In a particular advantageous embodiment of the inventive method the navigation information for the static route is only optically output and for the dynamic route is output both acoustically and optically.

According to a further preferred embodiment, the navigation system can further comprise position detection means being designed to provide current position data and wherein the processing means are designed such that it identifies whether the current position of the navigation system is on the static route and/or the dynamic route or on neither.

In another preferred embodiment, the communication means of the navigation system can be designed such that if the navigation system is on the static route, the static route navigation information is output and if the navigation system is on the dynamic route but not on the static route, then the dynamic route navigation information is output. Thus using the current position data the navigation system knows, depending on this position, what kind of outputting format should be used. For example on the static route, the user receives only navigation information via the optical means, such as a screen, whereas if the user is outside the static route it makes sense to also provide the user with

acoustically output information. In other words, the use of the navigation system becomes more comfortable.

In another preferred embodiment, the navigation system can further comprise comparing means being designed to compare the static route and the dynamic route and the communication means are designed such that dynamic road navigation information concerning the differences is output. The differences are preferably output in the format of the dynamic navigation information, thus usually output optically and acoustically, to ensure that the user is well informed about the dynamic situation, so that the user can decide whether he wants to follow the dynamic route or the static route. Thus again the comfort of using the navigation system is enhanced.

According to a further embodiment, the navigation system can further comprise comparing means to compare the static and the dynamic route, wherein comparing means are designed such that if the current position is both on the static route and the dynamic route, the following manoeuvres based on the current position of the static route and the dynamic route are compared and that the communication means are designed such that if the manoeuvres are different navigation information concerning the dynamic route is output. This brings the advantage that even while the user is travelling on the static route he nevertheless receives additional information should the following step on the static and dynamic routes be different. Thus, at the right moment, the user can make a decision whether to follow the usual static route or to follow the guidance advice of the navigation system, resulting in a further enhanced comfort of the navigation system.

The invention further provides a vehicle, in particular a car, comprising one of the previously described navigation systems.

In the following, examples of the inventive method to assist navigation are described with respect to the Figures.

Fig. 1 shows a flow chart of one embodiment of the inventive navigation method applied to navigation in areas being familiar to the user of a navigation system, using the inventive navigation method,

Fig. 2 shows a flow chart of a further aspect of the inventive navigation method, illustrating the role of current position data,

Figs. 3a – 3d show application examples of the inventive method, and

Fig. 4 shows a flow chart for a navigation method according to the prior art.

Fig. 1 shows one embodiment of the inventive navigation method. After starting up the navigation system, step 100 consists of determining whether the navigation is performed in an area which is known to the user. If the area he is travelling in is unknown to the user, the method proceeds with step 101 which is the method according to the prior art, as has been described above in relation to Fig. 4. If, however, the user navigates in a known area, for example in his home town, the method proceeds with step 102.

Step 102 consists of providing data to the navigation system. This data includes the digitized map containing road information, the final destination waypoint the user wants to drive to, and at least one further waypoint, for example, the position in which the user is currently situated. Based on this data, in step 103 the navigation system determines a route which is called the static route and navigation information which will be output at corresponding waypoints on the route. As an alternative, a known route could also be directly uploaded into the memory of the navigation system. Such a known route may have formerly been stored on a non-volatile memory, like the internal non-volatile memory of the navigation system, a CD ROM, a floppy disk or similar storage devices. At the same time it is of course also possible to save a determined static route onto non-volatile memory.

In step 104, the navigation system determines a second route, the dynamic route. To determine the dynamic route and the corresponding navigation information, the navigation system not only uses the data already input in step 102 comprising the final destination waypoint and at least one further waypoint and static road information from the digitized map, but further also bases the calculation on dynamic information which becomes available to the navigation system in step 105. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may also changing in time. Examples for dynamic information are information about traffic jams, closed roads, road construction work and special weather conditions such as

snow or ice, which the system, for example, receives via TMC messages. Thus, in contrast to the static route which is fixed as the data the static route is based on is not varying in time, the dynamic route which is determined based on static information plus the dynamic information is not fixed and might well vary in time.

Step 106 consists of comparing the static and the dynamic route. For the case that the navigation system identifies that those two routes are different, the differences are output to the user in step 107. To draw the attention of the user of the navigation system to this difference, the navigation information outputs the difference preferably using optical means, e.g. a screen, and acoustical means.

In step 108 the navigation system checks whether the current position, whereby the current position data is available to the navigation system via a positioning system such as a device based on the global positioning system (GPS), corresponds to a position for which the next manoeuvre step is different for the static route and the dynamic route. If this is not the case the method proceeds with process step 109. In this case the user follows the static route and as he is familiar with this static route, e.g. his route to work or back home, the navigation information, created in step 103, is preferably not output or output in an optical way only, on the screen of the navigation system. No acoustic outputting shall take place as this would only annoy the user who is anyway already aware of the route. However, it is of course at any time possible, that the user decides, by adapting the configuration parameters of the navigation system that nevertheless he also wants to receive the information in an acoustic way. In step 110 it is then checked whether the final destination has been reached. If this is the case the navigation method stops. If this is not the case the method continues with step 108.

If in step 108, the navigation system detects that the next manoeuvre step is different for the dynamic and the static route the process continues with step 111. In this step the navigation system proposes to follow the dynamic route. The corresponding navigation information is then preferably output optically and acoustically, to draw the attention of the user to the fact that dynamic and static route will be different for the next manoeuvre step. In step 112, the navigation system detects, based on position data from the positioning device, whether the user has decided to follow the dynamic route or the static route. If the user decided to follow the static route, the process continues with step 109 already described above. If, to the contrary, the user has decided to follow the dynamic

route in order to, for example, avoid a traffic jam, the process continues with step 113. Now the user follows the dynamic route which means that he is not travelling on the static route anymore and therefore it makes sense to not only output navigation information concerning the dynamic route, which has been produced in step 104, in an optical way only, on the screen of the navigation system, but also to use acoustic means. For the case that the user does not wish to receive information in an acoustic way, the method provides the possibility to declare at any moment that the dynamic route should be considered as the static route (the corresponding process steps are not shown).

In process step 114, the navigation system checks whether the current position with the current position data provided by the positioning device is on the dynamic route only or also on the static route. In the case that the current position is both on the dynamic route and the static route, which means that the navigation system has guided the user back on the static route, the process continues with step 109.

For the case that the user is still situated on the dynamic route only, the process continues with step 115. Therein, it is checked whether the current position corresponds to the final destination waypoint. If this is the case, the navigation method ends. If this is not the case, the method continues with step 113.

Any time the navigation system receives new dynamic data, a new dynamic route and new navigation information is re-determined, and the corresponding differences and following manoeuvre steps are announced (the detailed process steps are not shown).

The shown flow of process steps is not the only possibility to implement the invention. Other variants can be created by exchanging the order of the process steps such as, for example, process steps 103 and 104. It is also, of course, possible to apply the described navigation method for areas that are not known to the user. For this case, it is useful that the user has the possibility to declare at any time that the static route should be considered as being the dynamic route in order to also receive navigation information in an acoustic way, even if no special situations leading to dynamic information are currently present.

The flow chart shown in Fig. 2 represents process steps which run in parallel to the steps as shown in Fig. 1. Step 200 consists of starting up the positioning device which

determines current position data of the navigation system. This device could, for example, be based on the global positioning system technology (GPS). In step 201 the positioning system provides current position data to the navigation system. In step 202 the navigation system then checks whether this current position corresponds to a waypoint on the static route. If this is the case, the process continues with step 201. If this is not the case, the method proceeds to step 203 where the navigation system checks whether the current position corresponds to a waypoint on the dynamic route. If this is the case, the process continues with process step 201.

If this is not the case, the method proceeds with process step 204 which consists of determining a new dynamic route. Therein process step 204 corresponds to process step 104 in Fig. 1. This means that the process shown in Fig. 1 can be continued with the newly determined dynamic route. The process as shown in Fig. 2 continues with process step 205 in which the navigation system checks whether it should consider the new dynamic route as a new static route. If this is not the case, the process continues with step 201. If however the user has declared that he would like the dynamic route to be considered as the static route, which could be the case if for example the user is also aware of the new dynamic route and does not wish to receive special acoustic information about this dynamic route, then the process continues with step 206. It is also imaginable that the navigation system itself could consider that the newly calculated dynamic route could eventually also be considered as being a static route and ask the user to acknowledge or refuse such a proposal. Finally, in step 206 a new static route is defined as being the same as the newly determined dynamic route of process step 204. The process then continues with process step 201. The whole process runs until the navigation system has detected that the final destination waypoint has been reached. Thus, whenever the navigation method as described with respect to Fig. 1 needs current position data and also needs to know whether this data corresponds to the static and/or the dynamic route or to neither, this data can be provided via the process as described with respect to Fig. 2.

In a variant, step 205 may consist in checking whether, besides the new dynamic route, also a new static route shall be determined. If this is the case, step 206 would consist in determining a new static route and the navigation method according to Fig. 1 would then be based (from step 106 on) on these two newly determined routes.

Figs. 3a – 3d show examples of an application of the navigation method according to the invention. Same reference numerals in all four Figures correspond to identical features and detailed explanations will only be given with respect to Fig. 3a and not constantly repeated. The Figs. 3a – 3d, showing examples of the application, may also correspond to the way the static and dynamic routes are output optically, like for example on the screen of a navigation system. However in this case they only represent an example of an implementation and not the only possible way of implementation. In particular, the information does not need to be output graphically, but could also be output using text.

Point A corresponds to a starting point of a route and point B to its final destination waypoint. It is thereby of no importance whether point A corresponds to the current position of the navigation system. Furthermore the coordinates or the description of point A could be provided to the navigation system manually or the positional data could be provided by the positioning device, as mentioned earlier. In the latter case point A does correspond to the current position. Using road information from a digitized map which has been loaded into the memory or which is permanently present in the memory of the navigation system a static route 301 is determined. This static route 301, shown in a solid line, may also be provided to the navigation system by simply uploading the static route 301 from a storage device, being either an internal part of the navigation system or an external device. Depending on predetermined parameters the exact form of the static route 301 may vary. For instance, route 301 could be calculated on the basis of the shortest way between A and B, or on the quickest way, taking into account not only the distance but also estimations of average speed depending on the type of road.

In addition to the static route the dynamic route is also determined. As described above, the dynamic route takes into account dynamic information. Such a dynamic information could, for example, be that the navigation system receives the information that at position C a traffic jam is present. Thus the dynamic route 302, shown in dotted lines, will bypass point C. As in this situation the dynamic and the static route are different, the navigation system will provide the user with navigation information concerning the difference (corresponding to step 107 in Fig.1). To ensure that the user is aware of that difference, the output format for the dynamic route is used meaning that in particular the navigation information is also output in an acoustical way.

From point A up until point 303 the static route and the dynamic route are the same. Thus, up to point 303 the navigation system will provide navigation information according to the output format of the static route. In particular, navigation information concerning the route up until point 303 will only be output in an optical way.

At the moment the user reaches point 303 or the vicinity of point 303, the navigation system will realise that the following manoeuvre step for the static route 301 and the static route 302 is different (step 108 in Fig. 1). Therefore the user will be informed using the output format for the dynamic route, that it is advantageous to follow a dynamic route 302 and not the static route 301. As an example the navigation system could announce, in an acoustical way, that "A traffic jam is ahead on the static route, please go straight". At any time the user has the possibility to declare that the dynamic route should be considered as the static route. This could be the case when the user prefers to follow from now on the dynamic route instead of the static road, even if the dynamic route takes longer.

Fig. 3b shows a second example of the application of the inventive method. The way the dynamic route 302 is determined is different from the way the dynamic route has been determined in the application example corresponding to Fig. 3a. Dynamic route 304 is determined such that the user bypasses the point C, for example representing a traffic jam, and returns back on the static route 301, here shown at the position 305. Again, as for the previous example, the bypassing part (between points 303 and 305 on the dynamic route 304) may be determined according to different criteria, such as the shortest way back to the static route 301 by bypassing point C, or the fastest way back to the static route 301 taking into account average speeds for the roads used.

Fig. 3c shows a further example of an application of the inventive method. It is based on the example shown in Fig. 3b, with the difference that the user is travelling on the static route 301, where before reaching waypoint 307 the navigation system receives new dynamic information concerning waypoint D, for example a new traffic jam. In this case the navigation system may determine a new dynamic route based on dynamic route 304 with a bypassing section 306 between the waypoints 307 and 308, in order to bypass the waypoint D. In this example, again as for the example illustrated in Fig. 3b, the navigation system is configured such that the user is guided back onto the static route.

However, as an alternative the navigation system may be configured such that the dynamic route is re-determined such that the fastest or shortest way to the final destination waypoint B is found, taking into account the dynamic information concerning waypoints C and D.

Fig. 3d shows a fourth example of an application of the inventive navigation method. It shows another variant of the example illustrated in Fig. 3a. At position 309 the user of the navigation system quits both the static route 301 and the dynamic route 302. This might happen when the user makes a navigation error or if he wants to leave the usual route, the static route 301, on purpose, when for example he needs to visit another place on his way. In this case the user starts to move on a route 310, shown in dots, which has not previously been determined by the navigation system. However, using the positional data, which the navigation system receives from the positioning device, the navigation system will identify that the user is no longer on the static or the dynamic route 301, 302 and therefore calculates a new dynamic route 311 (shown in a dash-dot line). In a variant this calculation of a new dynamic route may be performed only on request from the user.

When the user travels on the newly determined dynamic route 311 he will reach the waypoint 312 where the navigation system will inform the user that he has the possibility to continue on the static route 301 or that he could continue on the dynamic route 311. Preferably, according to the invention, the information provided at point 312 is output using the dynamic route output format, meaning that in particular optical and acoustical means are used to inform the user.

In addition to the illustrated examples, many other variants exist which are also according to the invention. For example, more than two waypoints may be found and the static and dynamic routes determined such that they will pass through all waypoints.

Claims

1. Method to assist navigation comprising the steps of:
 - providing a digitized map,
 - determining a static route based on at least two waypoints and static road information from the digitized map or by uploading a route,
 - determining a dynamic route based on static road information from the digitized map and dynamic information and
 - outputting navigation information.
2. Method according to claim 1, further comprising the steps of comparing the static route and the dynamic route, and outputting dynamic route navigation information if the static route and the dynamic route differ.
3. Method according to claim 1 or 2, further comprising, preceding the outputting step, the step of formatting the navigation information output differently for the static route navigation information and for the dynamic route navigation information.
4. Method according to claim 3, wherein navigation information for the static route is not output at all or output only optically and navigation information for the dynamic route is output acoustically.
5. Method according to one of the preceding claims, further comprising the step of determining current position data.
6. Method according to claim 5, wherein the dynamic route is re-determined on a regular basis and/or when new dynamic information is provided to the navigation system and/or if the current position is neither on the previously determined dynamic route nor on the static route.
7. Method according to claim 6, wherein, when the current position is neither on the previously determined dynamic route nor on the static route, the dynamic route is re-determined such that the re-determined dynamic route and the static route have more than one waypoint in common.

8. Method according to one of the claims 5 to 7, further comprising the step of outputting static route navigation information if the navigation system is on the static route and providing dynamic route navigation information if the navigation system is on the dynamic route but not on the static route.
9. Method according to one of the claims 5 to 8, further comprising the step of comparing a following manoeuvre step of the static route and a following manoeuvre step of the dynamic route, if the current position data corresponds to a waypoint on both the static and the dynamic route, and outputting dynamic route navigation information about the following manoeuvre step, if the manoeuvre steps are different.
10. Method according to one of the preceding claims, wherein at least one of the steps of determining the static and/or the dynamic route is performed on request.
11. Method according to one of the preceding claims, further comprising the step of storing the static route on a non-volatile memory.
12. Computer program product directly loadable into an internal memory of a digital computer, comprising software code portions for performing the steps of the method according to one of the claims 1 to 11.
13. Computer program product stored on a medium readable by a computer system comprising computer readable program means for causing a computer to perform the steps of the method according to one of the claims 1 to 11.
14. Navigation system, in particular for performing the method according to one of the claims 1 to 11, comprising
 - input means for inputting data;
 - data storage means for storing data, in particular a digitized map;
 - dynamic information receiving means for receiving dynamic information data;
 - data processing means for providing navigation information;

- outputting means for outputting navigation information, in particular optical and acoustical means;

wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map or by uploading a route and a dynamic route is determined based on static road information from the digitized map and dynamic information.

15. The navigation system according to claim 14, further comprising formatting means being designed to format the output of the navigation different for the static route and the dynamic route.
16. The navigation system according to claim 14 or 15, further comprising position detection means being designed to provide current position data and wherein the processing means are designed such that it identifies whether the current position of the navigation system is on the static route and/or the dynamic route or on none of both.
17. The navigation system according to claim 16, wherein the communication means are designed such that if the navigation system is on the static route static route navigation information is output and if the navigation system is on the dynamic route but not on the static route dynamic route navigation information is output.
18. The navigation system according to one of claim 14 to 17, further comprising comparing means being designed to compare the static route and the dynamic route and wherein the communication means are designed such that dynamic road navigation information concerning the differences is output.
19. The navigation system according to one of claims 16 to 18, further comprising comparing means to compare the static and the dynamic route, wherein the comparing means are designed such that, if the current position is both on the static route and the dynamic route, the following manoeuvre, based on the current position, of the static route and the dynamic route are compared and that the communication means are designed such that if the manoeuvre are different, navigation information concerning the dynamic route is output.

20. Vehicle comprising the navigation system according to claims 14 to 20.

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(72) Inventor; and

(75) Inventor/Applicant (for US only): **STEGE, Kurt [DE/DE]; Habichtsweg 4, 22307 Hamburg (DE).**

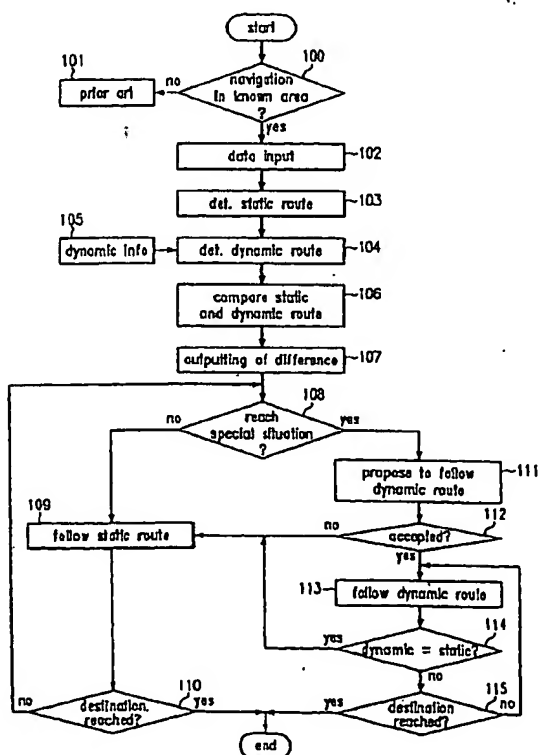
(74) Agent: **WEIGELT, Udo; Grünecker, Kinkeldey, Stockmair & Schwanhäusser, Anwaltssozietät, Maximilianstrasse 58, 80538 München (DE).**

(81) Designated States (unless otherwise indicated, for every kind of national protection available): **AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.**

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[Continued on next page]

(54) Title: **NAVIGATION METHOD AND NAVIGATION SYSTEM**



(57) Abstract: The invention relates to a method to assist navigation in particular in regions the user of the navigation system is relatively well familiar with, comprising the steps of providing a digitized map, determining a static route based on at least two waypoints and static road information from a digitized map or by uploading a route, determining a dynamic route based on static road information from the digitized map and dynamic information and outputting navigation information. The invention is further directed to a navigation system comprising input means for inputting data, data storage means for storing data, in particular a digitized map, dynamic information receiving means for receiving dynamic information data, data processing means for providing navigation information and outputting means for outputting navigation information, in particular optical and acoustical means, wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map and dynamic information.

WO 2005/001389 A1

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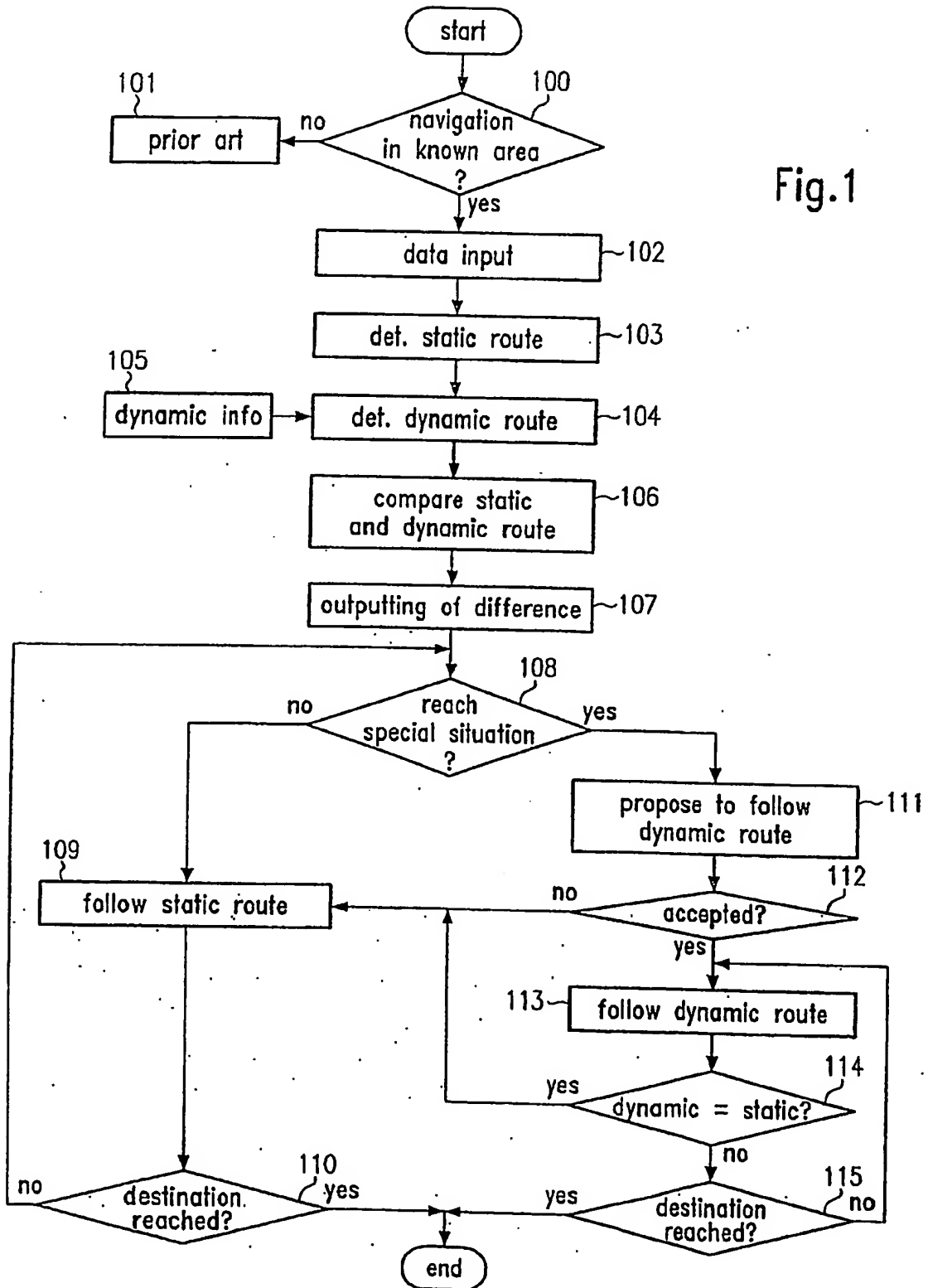
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Fig.1



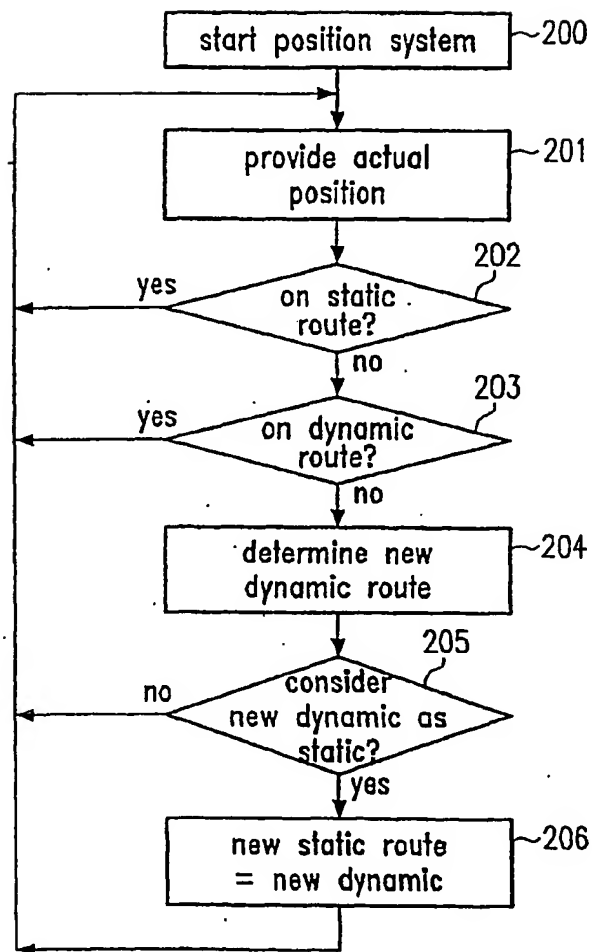


Fig.2

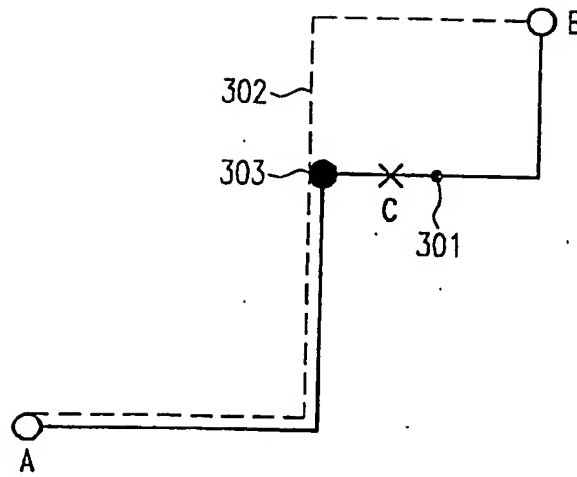


Fig.3a

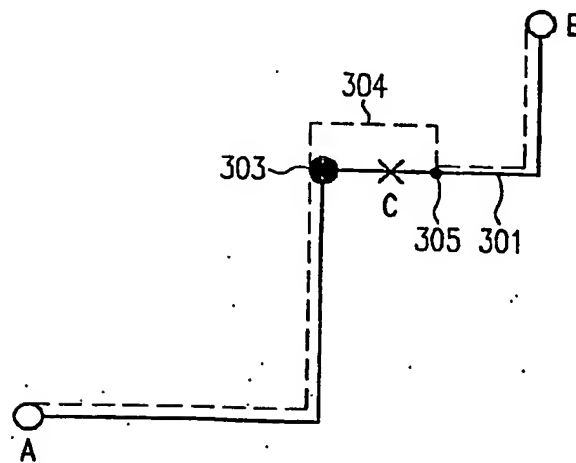


Fig.3b

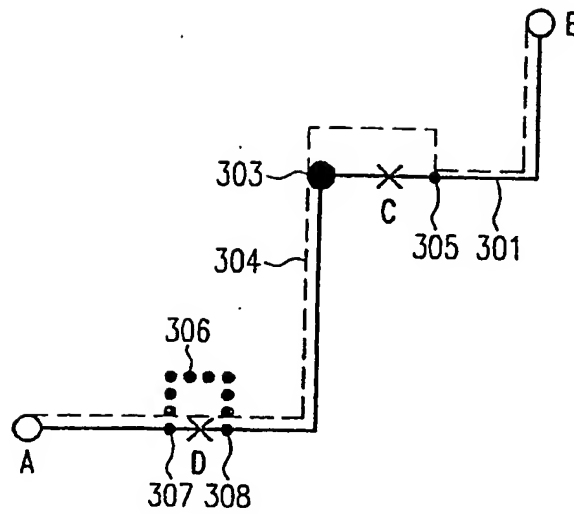


Fig.3c

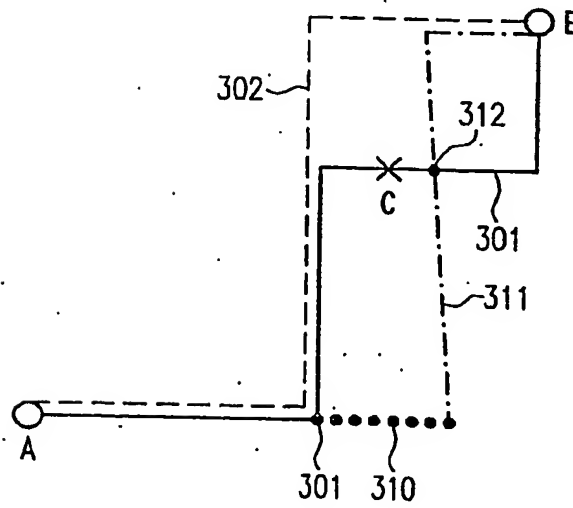


Fig.3d

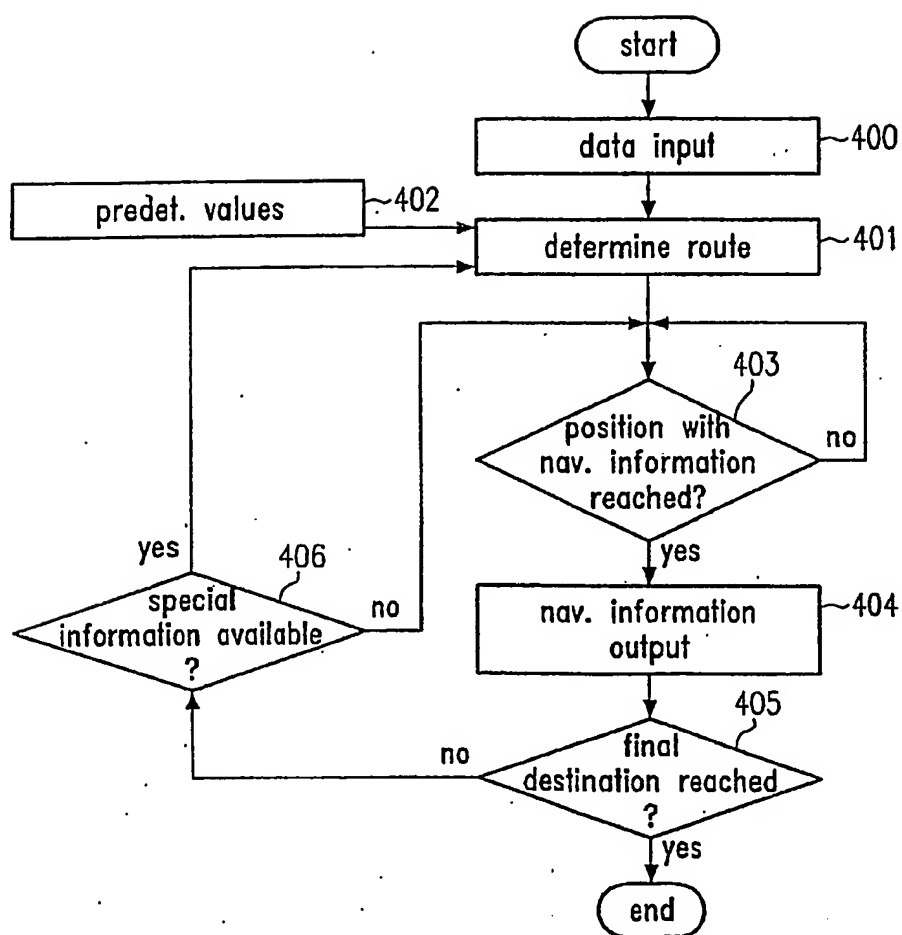


Fig.4

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- Arrived Abroad, June 12, 2010, 6:30 pm, GERMANY
- International Dispatch, June 09, 2010, 11:08 pm, ISC LOS ANGELES CA (USPS)
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EXHIBIT C

June 7, 2010

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Mr. Kurt Stege
Habichtsweg 4
Hamburg, Germany 22307

****REMINDER****
AWAITING SIGNED DOCUMENTS
June 29, 2010

EH847794075US

Re: Harman Becker Automotive Systems GmbH
U.S. Patent Application Serial No. 10/562,413
(based on PCT/EP2004/006991 filed June 28, 2004)
Title: NAVIGATION METHOD AND NAVIGATION SYSTEM
Inventor: STEGE, Kurt
The Eclipse Group Docket No. HI09032USU (P03011US)

Subject: Transmitting Application and Formal Documents

Dear Mr. Stege:

We are intellectual property counsel for Harman Becker Automotive Systems GmbH ("Harman"). We understand that you were employed by Harman at the time the above-identified application was filed with the USPTO and that you were named as an inventor.

In accordance with your employment with Harman, we understand that you acknowledge Harman's ownership of your work product in connection with the NAVIGATION METHOD AND NAVIGATION SYSTEM that is the subject of the attached application.

We have attached a Combined Declaration and Power of Attorney for signature recognizing you as an inventor and Harman as the owner of the associated patent rights. The Combined Declaration and Power of Attorney declares you as an inventor and provides our firm with the authority to prosecute the application on behalf of Harman.

We have also attached the following documents for your files:

1. Copy of Claiming Letter; and
2. Copy of the application as filed with the USPTO.

The Claiming Letter verifies that through your employment with Harman, all rights to the work product have been assigned to Harman.

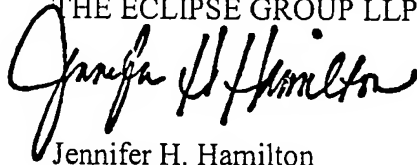
Jennifer H. Hamilton | t: 818.488.8141
10605 Balboa Blvd., Suite 300 | f: 818.332-4205
Granada Hills, California 91344 | jhh@eclipsegrp.com

We would appreciate it if you would please sign, date and fax back the documents to us at (818) 332-4205 **no later than Monday, June 28, 2010**. Alternatively, if, for any reason, you refuse to sign these documents, we kindly ask that you notify us in writing of such refusal by email at jhh@eclipsegrp.com, along with an explanation as to why you refuse to sign.

Please let us know if you have any questions.

Sincerely,

THE ECLIPSE GROUP LLP



Jennifer H. Hamilton

JHH/dg
Enclosures

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below-named inventor, I hereby declare that:

1. My residence, post office address, and citizenship are as stated below next to my name.
2. I believe I am an original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention titled:

NAVIGATION METHOD AND NAVIGATION SYSTEM

the specification of which (check one):

- ☐ is attached hereto.
- ☒ was filed on: June 28, 2004
as International Application No.: PCT/EP2004/06991
- ☐ and was amended on: _____

3. I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

4. I acknowledge the duty to disclose information which is material to patentability as described in 37 C.F.R. 1.56, which is defined on the attached page.

5. I hereby claim foreign priority benefits under 35 U.S.C. 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate on this invention having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

| | | | | |
|---------------------|-----------|------------------------|-------------------------------------|--------------------------|
| <u>03 014 760.7</u> | <u>EP</u> | <u>27 June 2003</u> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| (Number) | (Country) | (Day/Month/Year Filed) | Yes | No |

6. I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose material information as defined in 37 C.F.R. 1.56, which is defined on the attached page, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Prior United States Application(s)

| | | |
|--------------------------|----------------------|-----------------------------------------|
| <u>PCT/EP2004/006991</u> | <u>June 28, 2004</u> | <u>Abandoned</u> |
| (Application Serial No.) | (Filing Date) | (Status)-(patented, pending, abandoned) |

7. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

8. I hereby appoint the following attorneys, and all attorneys associated with **Customer No. 34408** for The Eclipse Group LLP, with full power of substitution and revocation, to prosecute this application and to transact all business in the United States Patent and Trademark Office in connection with this application and

Robert P. Hart, Reg. No. 35,184
Corporate Counsel
Harman International Industries, Incorporated
8500 Balboa Blvd.
Northridge, CA 91329

Please direct all correspondence to:

Customer No. 34408

Please direct telephone calls to Jennifer H. Hamilton at (818) 488-8141 (facsimile (818) 332-4205)).

Full name of first sole inventor: Kurt Stege

Signature of inventor:

Date:

Residence and Post Office Address:

Habichtsweg 4
Hamburg, Germany 22307

Citizenship:

German

Section 1.56 Duty to Disclose Information Material to Patentability.

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) the closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

EINGANG 13 JAN 2003



HARMAN/BECKER Automotive Systems • Postfach 71 • 760 • D-76307 Karlsbad

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Herr
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Werk Karlsbad
Im Stöckmühle 1
D-76307 Karlsbad

Ihr Zeichen

Unser Zeichen: P&L-SP

Datum: Karlsbad, 12.12.2002

Invention Disclosure No. (Erfindungsmeldung Nr.): P03011

Date of Receipt (Eingangsdatum): 28.08.2002

Title:

Dynamische Fahrempfehlung

Dear Mr. Steg

HARMAN/BECKER Automotive Systems (Becker Division) GmbH, herewith refers to your above mentioned invention and declares to you unlimited proprietary claims in accordance with § 6 of the German Law regulating employee inventions.

HARMAN/BECKER Automotive Systems (Becker Division) GmbH bezieht sich hiermit auf Ihre o.g. Erfindung und erklärt, diese unbeschränkt in Anspruch zu nehmen gemäß § 6 des Gesetzes über Arbeitnehmererfindungen.

Yours sincerely

**HARMAN/BECKER Automotive Systems
(Becker Division) GMBH**

Dr. T. Bast
(P&L)

2002-01-07 KRA C/18

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Date and Signature of Inventor
(Datum und Unterschrift des Erfinders)

Co-Inventor (Miterfinder): keine

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| TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A SUBMISSION UNDER 35 U.S.C. 371 | | ATTORNEY'S DOCKET NO. 11336.1236 (P03011US) U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5) 10/562413 |
| INTERNATIONAL APPLICATION NO. PCT/EP2004/006991 | INTERNATIONAL FILING DATE June 28, 2004 | PRIORITY DATE CLAIMED June 27, 2003 |
| TITLE OF INVENTION NAVIGATION METHOD AND NAVIGATION SYSTEM | | |
| APPLICANT(S) FOR DO/EO/US KURT STEGE | | |
| Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information: | | |
| 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9), and (21) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)). a. <input checked="" type="checkbox"/> Is transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> Is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input type="checkbox"/> An English translation of the International Application into English (35 U.S.C. 371(c)(2)). a. <input type="checkbox"/> Is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)). a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). 10. <input type="checkbox"/> An English translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)) and/or amendments under Article 34. | | |
| Items 11 to 20 Below concern other document(s) or information included: | | |
| 11. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A preliminary amendment. 14. <input type="checkbox"/> An Application Data Sheet under 37 CFR 1.76. 15. <input type="checkbox"/> A substitute specification. 16. <input type="checkbox"/> A power of attorney and/or change of address letter. 17. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 37 CFR 1.821-1.825. 18. <input type="checkbox"/> A second copy of the published International application under 35 U.S.C. 154(d)(4). 19. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4). 20. <input checked="" type="checkbox"/> Other items or information: Return Post card. | | |

SEND COMPLETED FORM TO: Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

IP9 Rec'd PCT/PTO 23 DEC 2009

| U.S. APPLICATION NO. 10/562413 <small>(If known, see 37 CFR 1.52)</small> | | INTERNATIONAL APPLICATION NO. | | ATTORNEY'S DOCKET NO. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| The following fees are submitted: 21. <input checked="" type="checkbox"/> Basic national fee (37 CFR 1.492(a))\$300 22. <input checked="" type="checkbox"/> Examination fee (37 CFR 1.492(c)) If International preliminary report prepared by ISA/US or the examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)\$0 All other situations\$200 23. <input checked="" type="checkbox"/> Search Fee (37 CFR 1.492(b)) If the written opinion of the ISA/US or the International preliminary examination report prepared by IPEA/US indicates all claims satisfy provisions of PCT Article 33(1)-(4)\$0 Search fee (37 CFR 1.445(a)(2)) has been paid on the international application to the USPTO as an International Searching Authority\$100 International Search Report prepared and provided to the Office\$400 All other situations\$500 TOTAL OF 21, 22 and 23 = \$1000 <input type="checkbox"/> Additional fee for specification and drawings filed in paper over 100 sheets (excluding sequence listing or computer program listing filed in an electronic medium). The fee is \$250 for each additional 50 sheets of paper or fraction thereof. Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">CALCULATIONS</th> <th style="width: 50%;">PTO USE ONLY</th> </tr> <tr> <td></td> <td></td> </tr> <tr> <td style="text-align: right;">\$1000</td> <td></td> </tr> </table> | | CALCULATIONS | PTO USE ONLY | | | \$1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CALCULATIONS | PTO USE ONLY | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">Claims</th> <th style="width: 20%;">Number Filed</th> <th style="width: 20%;">Number Extra</th> <th style="width: 20%;">Rate</th> <th style="width: 20%;"></th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td>Total Claims</td> <td style="text-align: center;">20- 20 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$ 50.00</td> <td></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Independent Claims</td> <td style="text-align: center;">1- 3 =</td> <td style="text-align: center;">0</td> <td style="text-align: center;">x \$ 200.00</td> <td></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td>Multiple dependent claim(s) if Applicable)</td> <td></td> <td></td> <td style="text-align: center;">+ \$360.00</td> <td></td> <td style="text-align: right;">\$0.00</td> </tr> <tr> <td colspan="5" style="text-align: right;">TOTAL OF ABOVE CALCULATIONS =</td> <td style="text-align: right;">\$1000</td> </tr> </tbody> </table> | | | | Claims | Number Filed | Number Extra | Rate | | | Total Claims | 20- 20 = | 0 | x \$ 50.00 | | \$0.00 | Independent Claims | 1- 3 = | 0 | x \$ 200.00 | | \$0.00 | Multiple dependent claim(s) if Applicable) | | | + \$360.00 | | \$0.00 | TOTAL OF ABOVE CALCULATIONS = | | | | | \$1000 | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%; text-align: right;">\$1000</td> </tr> </table> | | | \$1000 |
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| <input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by %. | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: right;">SUBTOTAL =</td> <td style="width: 50%; text-align: right;">\$1000</td> </tr> </table> | | SUBTOTAL = | \$1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Processing fee of \$130.00 for furnishing the English translation later than the <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: right;">\$</td> <td style="width: 50%;"></td> </tr> </table> | | \$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| \$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31), \$40.00 per property + | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: right;">TOTAL NATIONAL FEE=</td> <td style="width: 50%; text-align: right;">\$1000</td> </tr> </table> | | TOTAL NATIONAL FEE= | \$1000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| a. <input type="checkbox"/> A check in the amount of \$_____ to cover the above fees is enclosed. b. <input checked="" type="checkbox"/> Please charge my Deposit Account No. 23-1925 in the amount of \$1000 to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-1925. A duplicate copy of this sheet is enclosed. d. <input type="checkbox"/> Fees are to be charged to a credit card. WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038. | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: right;">Amount to be refunded</td> <td style="width: 50%; text-align: right;">\$</td> </tr> <tr> <td style="width: 50%; text-align: right;">charged</td> <td style="width: 50%; text-align: right;">\$</td> </tr> </table> | | Amount to be refunded | \$ | charged | \$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| charged | \$ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Send All Correspondence to: <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> Brinks Hofer Gilson & Liore P.O. Box 10395 Chicago, IL 60610 </div> <div style="width: 50%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> </td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;">Signature</td> <td style="width: 50%;"></td> </tr> <tr> <td style="width: 50%;">Name</td> <td style="width: 50%;">Jason M. Wejnert</td> </tr> <tr> <td style="width: 50%;">Registration Number</td> <td style="width: 50%;">55,722</td> </tr> </table> </div> </div> | | | | | | | | Signature | | Name | Jason M. Wejnert | Registration Number | 55,722 | | | | | | | | | | | | | | | | | | | | | | | | |
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| Name | Jason M. Wejnert | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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Navigation method and Navigation system

The invention relates to a method and a navigation system to assist navigation, in particular, in regions the user of the navigation system is relatively well familiar with.

Since the outcome of satellite navigation data, navigation systems, especially for cars, are getting more and more used. Usually those navigation systems receive position data from a device based on the global positioning system (GPS) technology.

The navigation systems are most commonly used in cases for which the user of the navigation system is not familiar with the area he is travelling in or travelling to. The user then communicates the destination he wants to reach to the system and eventually also enters further waypoints to which he wants to travel on his way to his final destination. A waypoint is a navigation point, characterized by its coordinates which is determined either by the user or the system. Based on a digitized map, which comprises road information for the area the user is interested in, the navigation system calculates a route, being a succession of waypoints, and assists the user in finding the right way to the waypoints and the final destination. For instance, in the case of a car navigation system, the navigation system tells the driver which road he should drive on and where he has to change onto another road. For this the navigation system employs means to provide the information in a graphical way, but also assists with acoustic information.

Today's navigation systems typically provide three operation modes. Firstly, the acoustical and optical guidance, secondly, optical guidance only and thirdly, no guidance. None of the three operation modes is however suited to be used in areas the user of the navigation system is familiar with. As the user usually knows where to go and how to reach the destination, mode 1 is not suitable as the user receives too much navigation information and he is especially not interested in acoustic announcements. This disadvantage is not present in the second mode. In this case, however, navigation information could still be interesting for the user as, for example, a traffic jam or road constructions may be present on the route that the user usually takes. Then, only providing optical guidance is not sufficient, as the chance is very high that the user will not read the warnings that are provided by the navigation system and, therefore, he will end up in the traffic jam. It is evident that also the third mode is not suited, as no information is provided at all.

Fig. 4 shows a typical navigation method as used in navigation systems according to the prior art. After starting up the navigation system, step 400 consists in inputting data into the navigation system. This data comprises a digitized map that is uploaded into a memory of the navigation system and at least the final destination waypoint. A second waypoint, usually the starting waypoint, is needed to be able to calculate a route and can either be manually provided by the user or be provided automatically by a positioning system. Step 401 then consists in calculating a route based on the input data. To calculate this route, the system may use further predetermined values which in step 402 have either been input manually by the user or consist of default settings. These predetermined values may contain certain parameters on how to calculate a route, for example, if the user wishes to find the shortest possible way from the starting point to the final destination waypoint or the fastest route, or on how to output the navigation information, generated in step 402. The system may also use further information concerning, for example, traffic jams to calculate a route. Usually this kind of information is received via radio and input into the navigation system.

In step 403, the method consists in checking whether a position has been reached on the route for which navigation information has been produced by the navigation system. If this is not the case, step 403 is repeated until such a position is reached. If a position for which navigation information has been produced is reached, the corresponding navigation information is output in step 404. The navigation information is then shown on a screen and/or acoustically announced. Step 405 consists in checking whether the final destination waypoint has been reached. If this is the case, the navigation method ends. If this is not the case, the method proceeds with step 406, wherein the navigation system checks whether new updated information, about traffic jams for example, is available to the system. If this is the case, the method proceeds with step 401 in which a new route is calculated based on the newly available information. If this is not the case, the process continues with step 403.

In such a prior art system, when a new route is calculated, due to updated road information, the old route is overwritten and a comparison of the new and old route is not possible, neither for the user nor for the navigation system. This is in particular disadvantageous for cases in which the amount of navigation information given for the old and the new route shall differ.

It is therefore the object of this invention to provide a method to assist navigation and to provide a navigation system which overcomes the above stated problems and further enhances the comfort of navigation assistance.

This object is achieved by the method according to claim 1 and the navigation system according to claim 14.

Accordingly, a method to assist navigation is provided comprising the steps of:

providing a digitized map,

determining a static route based on at least two waypoints and static road information from the digitized map or by uploading a route,

determining a dynamic route based on static road information from the digitised map and dynamic information, and

outputting navigation information.

The user can provide a navigation system, using the inventive navigation method, with at least two waypoints, for example, a starting waypoint and a final destination waypoint. Alternatively a positioning system can provide the starting point, being the current position, and - based on this information together with road information from the provided digital map - the navigation system can compute the so-called static route which is one possible way to go from the one waypoint to the other and which is described as a succession of waypoints. Depending on predetermined parameters, either predetermined by the system or by the user, different static routes can be obtained, like for example the fastest route or the shortest route. As an alternative, the static route could also be uploaded into the navigation system from a storage medium. The static route represents, for example, a route which the user regularly travels on, like the daily way from home to work and back. However the calculation does not take into account any information which may be variable in time.

In contrast thereto a second route, the dynamic route, is determined which, in addition to the waypoints and the road information, also takes into account dynamic information comprising, amongst others, traffic jam information, construction work information, closed road information and/or weather information. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may be also changing in time. Depending on the current situation, the determined dynamic route may therefore be different from the static route. In this way, both a static and a dynamic route are determined and present. Depending on the way the navigation system is configured, it is then possible to output the obtained navigation data either about the static route or the dynamic route. Thus, the navigation method according to invention may provide the necessary navigation information also in a situation in which the user is familiar with the roads he is travelling on, as either the more complete navigation information of the dynamic route or the reduced information set of the static route can be communicated to the user.

A preferred embodiment of the method can comprise the steps of comparing the static route and the dynamic route, and outputting dynamic route navigation information if the static route and the dynamic route are different.

In particular, at the moment the dynamic route is determined, the user is informed that on his usual route, which corresponds to the static route, a problem may currently be present which might lead to a longer travelling time and therefore the alternative, the dynamic route, can be proposed. Then the user knows right from the start that it might be advantageous to follow the proposed dynamic route.

According to an advantageous embodiment, the method can further comprise the step of formatting the navigation information output differently for the static route navigation information and for the dynamic route navigation information, whereby the formatting step precedes the navigation information outputting step. This means that the inventive method provides the possibility that the amount of information and the way the information is given may be different depending on whether the static route or the dynamic route is followed, thereby further improving the comfort of the navigation system.

In a particular advantageous embodiment of the method, navigation information for the static can be not output or only output optically and navigation information for the dynamic route can be output acoustically.

This means, when the user is moving on the static route, e.g. a road he is familiar with, he is not overloaded with acoustical navigation information which he does not need anyway. If static navigation is not at all output, a screen, the navigation system is using, may be used for different applications like information about the radio stations or the like. However, in the case that due to a dynamic event, the navigation system proposes to now follow the dynamic route, it becomes important that the information is provided acoustically so that it is ensured that the user receives the necessary navigation information at the time he needs an update about the situation. Optionally navigation information concerning the dynamic route could also be output in an optical way on a screen.

In a preferred embodiment, the inventive method can further comprise the step of determining current position data. It is particularly interesting for the user to know exactly where he is situated. The current position can, for example, be shown on the screen of the navigation system.

According to a further preferred embodiment, the dynamic route can be re-determined on a regular basis and/or when new dynamic information is provided to the navigation system and/or if the current position is neither on the previously determined dynamic route nor on the static route. By providing this update concerning the dynamic route, it can be ensured that changing situations are taken into account. This is particularly important when a previously announced traffic jam has disappeared so that the user should not follow the previously determined dynamic route but can continue to follow the static route. The static route, however, might be the same as the newly determined dynamic route. Of particular importance is also the situation in which the user erroneously or purposely quits both the static route and the dynamic route. In this case, the previously determined dynamic route is no longer valid and, to be able to assist the user, it becomes necessary to re-determine a new dynamic route based on the new circumstances.

In a further variant of the method, the dynamic route can, when the current position is neither on the previously determined dynamic route nor on the static route, be re-determined such that the re-determined dynamic route and the static route have more than one waypoint in common. The user might not be interested in a newly determined dynamic route which only takes into account the final destination waypoint, but it could be that the user wants to return back to the static route as quickly as possible or in the shortest way. However, also in this case, the dynamic route determination still takes into account dynamic information.

In a further preferred embodiment, the method can further comprise the step of outputting static route navigation information if the navigation system is on the static route and providing dynamic route navigation information if the navigation system is on the dynamic route but not on the static route. If the user knows the area he is driving in and follows a route corresponding to the static route, he might not be interested in receiving too much navigation information. However, as soon as he decides to leave the static route to follow a dynamic route he might need to receive more information than usual. This ensures an enhanced comfort of the navigation method.

In a further variant, the inventive method can comprise the step of comparing a following manoeuvre step of the static route and the following manoeuvre step of the dynamic route, if the current position data corresponds to a waypoint on both the static and the dynamic route, and outputting dynamic route navigation information about the following manoeuvre step, if the manoeuvre steps are different. The manoeuvre step actually contains the description on how to reach a next waypoint of a route. This additional method step brings the advantage that even while the user is travelling on the static route he nevertheless receives additional information should the following step on the static and dynamic routes be different. Thus, at the right moment, the user can make a decision whether to follow the usual static route or to follow the guidance advice of the navigation system, resulting in a further enhanced comfort of the navigation system.

According to another preferred embodiment, at least one of the steps of determining the static and/or the dynamic route can be performed on request. This step is of particular interest in the case that the user has decided to follow the advice of the navigation system to quit the static route and follow the dynamic route. In the case of the user being familiar with the proposed dynamic route, it is advantageous that he has the choice

to decide that the dynamic route should be treated as a static route and thus the user will not receive too much navigation information. In addition this step is also of particular interest in the case that the user is positioned outside the static route and that the user wants the navigation system to determine a new static route, thus not taking into account dynamic information. The request from the user can be transmitted to the navigation system using, for example, a special button or a soft-key on the man machine interface or a speech recognition functionality. By providing these additional possibilities, the use of the navigation system is further rendered more comfortable.

Preferably, the navigation systems can provide an output, in particular an acoustic output, when the navigation system detects that a predetermined criterion is fulfilled. Especially in the case that the navigation system detects that the current position is not on the static route, as one example of a predetermined criterion, the navigation system could propose to the user to determine new route data leading perhaps to different static and/or dynamic routes, which the user could follow. It is then up to the user whether he wants to follow the advice or not and request that a new route, static and/or dynamic, is determined.

A further variant of the invention can comprise the further step of storing the static route on a non-volatile memory. Thus, the user can decide whether the route he is currently travelling on is one in which he will be interested in in the future. Therefore, it is advantageous to be able to store this route on a volatile memory on which, for example, other static routes could already be stored. Storing media may include CD ROMs, floppy disks, hard disks or any other kind of non-volatile memory.

The invention further provides a computer program product directly loadable into the internal memory of a digital computer comprising software code portions for performing the steps of one of the methods described above.

The invention also provides a computer program product stored on a medium readable by a computer system comprising computer-readable programme means for causing a computer to perform the steps of one of the previously described methods.

Furthermore, the invention provides the use of one of the methods as described above in a navigation system mounted in a vehicle, in particular, a car.

In addition, the invention provides a navigation system, in particular for performing one of the previously described methods, comprising:

input means for inputting data,

data storage means for storing data, in particular a digitized map,

dynamic information receiving means for receiving dynamic information data,

data processing means for providing navigation information,

outputting means for outputting navigation information, in particular optical and acoustical means,

wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map or by uploading a route and a dynamic route is determined based on static road information from the digitized map and dynamic information.

The user can provide the navigation system with at least two waypoints, like a starting waypoint and a final destination waypoint. Alternatively, a positioning system can provide a starting point, being the current position, and - based on this information together with road information from the provided digitized map - the navigation system can compute the so-called static route which is one possible way to go from the one waypoint to the other and which is described as a succession of waypoints. Depending on predetermined parameters, either predetermined by the system or by the user, different static routes can be obtained, like for example the fastest route or the shortest route. As an alternative, the static route could also be uploaded into the navigation system from a storage medium. The static route represents, for example, a route which the user regularly travels on, like the daily way from home to work and back. In any case, the determination of the static route does not take into account any information which may be variable in time.

In contrast thereto, the navigation system determines a second route, the dynamic route, which in addition to the static information such as waypoints and the road information,

also takes into account dynamic information comprising, amongst others, traffic jam information, construction work information, closed road information and/or weather information. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may be also changing in time. Depending on the current situation the determined dynamic route may therefore be different from the static route. In this way, both a static and a dynamic route are determined and present. Depending on the way the navigation system is configured, it is then possible to output the obtained navigation data either about the static route or the dynamic route. Thus, the navigation system according to the invention may provide the necessary navigation information also in a situation in which the user is familiar with the roads he is travelling on, as either the more complete navigation information of the dynamic route or the reduced information set of the static route can be communicated to the user.

In a further preferred embodiment, the navigation system can further comprise formatting means being designed to format the output of the navigation different for the static route and the dynamic route. This means that the navigation system gives the possibility that the amount of information and the way the information is given may be different depending on whether the static route or the dynamic route is followed, thereby further improving the comfort of the navigation system. In a particular advantageous embodiment of the inventive method the navigation information for the static route is only optically output and for the dynamic route is output both acoustically and optically.

According to a further preferred embodiment, the navigation system can further comprise position detection means being designed to provide current position data and wherein the processing means are designed such that it identifies whether the current position of the navigation system is on the static route and/or the dynamic route or on neither.

In another preferred embodiment, the communication means of the navigation system can be designed such that if the navigation system is on the static route, the static route navigation information is output and if the navigation system is on the dynamic route but not on the static route, then the dynamic route navigation information is output. Thus using the current position data the navigation system knows, depending on this position, what kind of outputting format should be used. For example on the static route, the user receives only navigation information via the optical means, such as a screen, whereas if the user is outside the static route it makes sense to also provide the user with

acoustically output information. In other words, the use of the navigation system becomes more comfortable.

In another preferred embodiment, the navigation system can further comprise comparing means being designed to compare the static route and the dynamic route and the communication means are designed such that dynamic road navigation information concerning the differences is output. The differences are preferably output in the format of the dynamic navigation information, thus usually output optically and acoustically, to ensure that the user is well informed about the dynamic situation, so that the user can decide whether he wants to follow the dynamic route or the static route. Thus again the comfort of using the navigation system is enhanced.

According to a further embodiment, the navigation system can further comprise comparing means to compare the static and the dynamic route, wherein comparing means are designed such that if the current position is both on the static route and the dynamic route, the following manoeuvres based on the current position of the static route and the dynamic route are compared and that the communication means are designed such that if the manoeuvres are different navigation information concerning the dynamic route is output. This brings the advantage that even while the user is travelling on the static route he nevertheless receives additional information should the following step on the static and dynamic routes be different. Thus, at the right moment, the user can make a decision whether to follow the usual static route or to follow the guidance advice of the navigation system, resulting in a further enhanced comfort of the navigation system.

The invention further provides a vehicle, in particular a car, comprising one of the previously described navigation systems.

In the following, examples of the inventive method to assist navigation are described with respect to the Figures.

Fig. 1 shows a flow chart of one embodiment of the inventive navigation method applied to navigation in areas being familiar to the user of a navigation system, using the inventive navigation method,

Fig. 2 shows a flow chart of a further aspect of the inventive navigation method, illustrating the role of current position data,

Figs. 3a – 3d show application examples of the inventive method, and

Fig. 4 shows a flow chart for a navigation method according to the prior art.

Fig. 1 shows one embodiment of the inventive navigation method. After starting up the navigation system, step 100 consists of determining whether the navigation is performed in an area which is known to the user. If the area he is travelling in is unknown to the user, the method proceeds with step 101 which is the method according to the prior art, as has been described above in relation to Fig. 4. If, however, the user navigates in a known area, for example in his home town, the method proceeds with step 102.

Step 102 consists of providing data to the navigation system. This data includes the digitized map containing road information, the final destination waypoint the user wants to drive to, and at least one further waypoint, for example, the position in which the user is currently situated. Based on this data, in step 103 the navigation system determines a route which is called the static route and navigation information which will be output at corresponding waypoints on the route. As an alternative, a known route could also be directly uploaded into the memory of the navigation system. Such a known route may have formerly been stored on a non-volatile memory, like the internal non-volatile memory of the navigation system, a CD ROM, a floppy disk or similar storage devices. At the same time it is of course also possible to save a determined static route onto non-volatile memory.

In step 104, the navigation system determines a second route, the dynamic route. To determine the dynamic route and the corresponding navigation information, the navigation system not only uses the data already input in step 102 comprising the final destination waypoint and at least one further waypoint and static road information from the digitized map, but further also bases the calculation on dynamic information which becomes available to the navigation system in step 105. Dynamic information is defined as being any further information that might lead to a change in the static route, and which may also changing in time. Examples for dynamic information are information about traffic jams, closed roads, road construction work and special weather conditions such as

snow or ice, which the system, for example, receives via TMC messages. Thus, in contrast to the static route which is fixed as the data the static route is based on is not varying in time, the dynamic route which is determined based on static information plus the dynamic information is not fixed and might well vary in time.

Step 106 consists of comparing the static and the dynamic route. For the case that the navigation system identifies that those two routes are different, the differences are output to the user in step 107. To draw the attention of the user of the navigation system to this difference, the navigation information outputs the difference preferably using optical means, e.g. a screen, and acoustical means.

In step 108 the navigation system checks whether the current position, whereby the current position data is available to the navigation system via a positioning system such as a device based on the global positioning system (GPS), corresponds to a position for which the next manoeuvre step is different for the static route and the dynamic route. If this is not the case the method proceeds with process step 109. In this case the user follows the static route and as he is familiar with this static route, e.g. his route to work or back home, the navigation information, created in step 103, is preferably not output or output in an optical way only, on the screen of the navigation system. No acoustic outputting shall take place as this would only annoy the user who is anyway already aware of the route. However, it is of course at any time possible, that the user decides, by adapting the configuration parameters of the navigation system that nevertheless he also wants to receive the information in an acoustic way. In step 110 it is then checked whether the final destination has been reached. If this is the case the navigation method stops. If this is not the case the method continues with step 108.

If in step 108, the navigation system detects that the next manoeuvre step is different for the dynamic and the static route the process continues with step 111. In this step the navigation system proposes to follow the dynamic route. The corresponding navigation information is then preferably output optically and acoustically, to draw the attention of the user to the fact that dynamic and static route will be different for the next manoeuvre step. In step 112, the navigation system detects, based on position data from the positioning device, whether the user has decided to follow the dynamic route or the static route. If the user decided to follow the static route, the process continues with step 109 already described above. If, to the contrary, the user has decided to follow the dynamic

route in order to, for example, avoid a traffic jam, the process continues with step 113. Now the user follows the dynamic route which means that he is not travelling on the static route anymore and therefore it makes sense to not only output navigation information concerning the dynamic route, which has been produced in step 104, in an optical way only, on the screen of the navigation system, but also to use acoustic means. For the case that the user does not wish to receive information in an acoustic way, the method provides the possibility to declare at any moment that the dynamic route should be considered as the static route (the corresponding process steps are not shown).

In process step 114, the navigation system checks whether the current position with the current position data provided by the positioning device is on the dynamic route only or also on the static route. In the case that the current position is both on the dynamic route and the static route, which means that the navigation system has guided the user back on the static route, the process continues with step 109.

For the case that the user is still situated on the dynamic route only, the process continues with step 115. Therein, it is checked whether the current position corresponds to the final destination waypoint. If this is the case, the navigation method ends. If this is not the case, the method continues with step 113.

Any time the navigation system receives new dynamic data, a new dynamic route and new navigation information is re-determined, and the corresponding differences and following manoeuvre steps are announced (the detailed process steps are not shown).

The shown flow of process steps is not the only possibility to implement the invention. Other variants can be created by exchanging the order of the process steps such as, for example, process steps 103 and 104. It is also, of course, possible to apply the described navigation method for areas that are not known to the user. For this case, it is useful that the user has the possibility to declare at any time that the static route should be considered as being the dynamic route in order to also receive navigation information in an acoustic way, even if no special situations leading to dynamic information are currently present.

The flow chart shown in Fig. 2 represents process steps which run in parallel to the steps as shown in Fig. 1. Step 200 consists of starting up the positioning device which

determines current position data of the navigation system. This device could, for example, be based on the global positioning system technology (GPS). In step 201 the positioning system provides current position data to the navigation system. In step 202 the navigation system then checks whether this current position corresponds to a waypoint on the static route. If this is the case, the process continues with step 201. If this is not the case, the method proceeds to step 203 where the navigation system checks whether the current position corresponds to a waypoint on the dynamic route. If this is the case, the process continues with process step 201.

If this is not the case, the method proceeds with process step 204 which consists of determining a new dynamic route. Therein process step 204 corresponds to process step 104 in Fig. 1. This means that the process shown in Fig. 1 can be continued with the newly determined dynamic route. The process as shown in Fig. 2 continues with process step 205 in which the navigation system checks whether it should consider the new dynamic route as a new static route. If this is not the case, the process continues with step 201. If however the user has declared that he would like the dynamic route to be considered as the static route, which could be the case if for example the user is also aware of the new dynamic route and does not wish to receive special acoustic information about this dynamic route, then the process continues with step 206. It is also imaginable that the navigation system itself could consider that the newly calculated dynamic route could eventually also be considered as being a static route and ask the user to acknowledge or refuse such a proposal. Finally, in step 206 a new static route is defined as being the same as the newly determined dynamic route of process step 204. The process then continues with process step 201. The whole process runs until the navigation system has detected that the final destination waypoint has been reached. Thus, whenever the navigation method as described with respect to Fig. 1 needs current position data and also needs to know whether this data corresponds to the static and/or the dynamic route or to neither, this data can be provided via the process as described with respect to Fig. 2.

In a variant, step 205 may consist in checking whether, besides the new dynamic route, also a new static route shall be determined. If this is the case, step 206 would consist in determining a new static route and the navigation method according to Fig. 1 would then be based (from step 106 on) on these two newly determined routes.

Figs. 3a – 3d show examples of an application of the navigation method according to the invention. Same reference numerals in all four Figures correspond to identical features and detailed explanations will only be given with respect to Fig. 3a and not constantly repeated. The Figs. 3a – 3d, showing examples of the application, may also correspond to the way the static and dynamic routes are output optically, like for example on the screen of a navigation system. However in this case they only represent an example of an implementation and not the only possible way of implementation. In particular, the information does not need to be output graphically, but could also be output using text.

Point A corresponds to a starting point of a route and point B to its final destination waypoint. It is thereby of no importance whether point A corresponds to the current position of the navigation system. Furthermore the coordinates or the description of point A could be provided to the navigation system manually or the positional data could be provided by the positioning device, as mentioned earlier. In the latter case point A does correspond to the current position. Using road information from a digitized map which has been loaded into the memory or which is permanently present in the memory of the navigation system a static route 301 is determined. This static route 301, shown in a solid line, may also be provided to the navigation system by simply uploading the static route 301 from a storage device, being either an internal part of the navigation system or an external device. Depending on predetermined parameters the exact form of the static route 301 may vary. For instance, route 301 could be calculated on the basis of the shortest way between A and B, or on the quickest way, taking into account not only the distance but also estimations of average speed depending on the type of road.

In addition to the static route the dynamic route is also determined. As described above, the dynamic route takes into account dynamic information. Such a dynamic information could, for example, be that the navigation system receives the information that at position C a traffic jam is present. Thus the dynamic route 302, shown in dotted lines, will bypass point C. As in this situation the dynamic and the static route are different, the navigation system will provide the user with navigation information concerning the difference (corresponding to step 107 in Fig.1). To ensure that the user is aware of that difference, the output format for the dynamic route is used meaning that in particular the navigation information is also output in an acoustical way.

From point A up until point 303 the static route and the dynamic route are the same. Thus, up to point 303 the navigation system will provide navigation information according to the output format of the static route. In particular, navigation information concerning the route up until point 303 will only be output in an optical way.

At the moment the user reaches point 303 or the vicinity of point 303, the navigation system will realise that the following manoeuvre step for the static route 301 and the static route 302 is different (step 108 in Fig. 1). Therefore the user will be informed using the output format for the dynamic route, that it is advantageous to follow a dynamic route 302 and not the static route 301. As an example the navigation system could announce, in an acoustical way, that "A traffic jam is ahead on the static route, please go straight". At any time the user has the possibility to declare that the dynamic route should be considered as the static route. This could be the case when the user prefers to follow from now on the dynamic route instead of the static road, even if the dynamic route takes longer.

Fig. 3b shows a second example of the application of the inventive method. The way the dynamic route 302 is determined is different from the way the dynamic route has been determined in the application example corresponding to Fig. 3a. Dynamic route 304 is determined such that the user bypasses the point C, for example representing a traffic jam, and returns back on the static route 301, here shown at the position 305. Again, as for the previous example, the bypassing part (between points 303 and 305 on the dynamic route 304) may be determined according to different criteria, such as the shortest way back to the static route 301 by bypassing point C, or the fastest way back to the static route 301 taking into account average speeds for the roads used.

Fig. 3c shows a further example of an application of the inventive method. It is based on the example shown in Fig. 3b, with the difference that the user is travelling on the static route 301, where before reaching waypoint 307 the navigation system receives new dynamic information concerning waypoint D, for example a new traffic jam. In this case the navigation system may determine a new dynamic route based on dynamic route 304 with a bypassing section 306 between the waypoints 307 and 308, in order to bypass the waypoint D. In this example, again as for the example illustrated in Fig. 3b, the navigation system is configured such that the user is guided back onto the static route.

However, as an alternative the navigation system may be configured such that the dynamic route is re-determined such that the fastest or shortest way to the final destination waypoint B is found, taking into account the dynamic information concerning waypoints C and D.

Fig. 3d shows a fourth example of an application of the inventive navigation method. It shows another variant of the example illustrated in Fig. 3a. At position 309 the user of the navigation system quits both the static route 301 and the dynamic route 302. This might happen when the user makes a navigation error or if he wants to leave the usual route, the static route 301, on purpose, when for example he needs to visit another place on his way. In this case the user starts to move on a route 310, shown in dots, which has not previously been determined by the navigation system. However, using the positional data, which the navigation system receives from the positioning device, the navigation system will identify that the user is no longer on the static or the dynamic route 301, 302 and therefore calculates a new dynamic route 311 (shown in a dash-dot line). In a variant this calculation of a new dynamic route may be performed only on request from the user.

When the user travels on the newly determined dynamic route 311 he will reach the waypoint 312 where the navigation system will inform the user that he has the possibility to continue on the static route 301 or that he could continue on the dynamic route 311. Preferably, according to the invention, the information provided at point 312 is output using the dynamic route output format, meaning that in particular optical and acoustical means are used to inform the user.

In addition to the illustrated examples, many other variants exist which are also according to the invention. For example, more than two waypoints may be found and the static and dynamic routes determined such that they will pass through all waypoints.

Claims

1. Method to assist navigation comprising the steps of:
 - providing a digitized map,
 - determining a static route based on at least two waypoints and static road information from the digitized map or by uploading a route,
 - determining a dynamic route based on static road information from the digitized map and dynamic information and
 - outputting navigation information.
2. Method according to claim 1, further comprising the steps of comparing the static route and the dynamic route, and outputting dynamic route navigation information if the static route and the dynamic route differ.
3. Method according to claim 1 or 2, further comprising, preceding the outputting step, the step of formatting the navigation information output differently for the static route navigation information and for the dynamic route navigation information.
4. Method according to claim 3, wherein navigation information for the static route is not output at all or output only optically and navigation information for the dynamic route is output acoustically.
5. Method according to one of the preceding claims, further comprising the step of determining current position data.
6. Method according to claim 5, wherein the dynamic route is re-determined on a regular basis and/or when new dynamic information is provided to the navigation system and/or if the current position is neither on the previously determined dynamic route nor on the static route.
7. Method according to claim 6, wherein, when the current position is neither on the previously determined dynamic route nor on the static route, the dynamic route is re-determined such that the re-determined dynamic route and the static route have more than one waypoint in common.

8. Method according to one of the claims 5 to 7, further comprising the step of outputting static route navigation information if the navigation system is on the static route and providing dynamic route navigation information if the navigation system is on the dynamic route but not on the static route.
 9. Method according to one of the claims 5 to 8, further comprising the step of comparing a following manoeuvre step of the static route and a following manoeuvre step of the dynamic route, if the current position data corresponds to a waypoint on both the static and the dynamic route, and outputting dynamic route navigation information about the following manoeuvre step, if the manoeuvre steps are different.
 10. Method according to one of the preceding claims, wherein at least one of the steps of determining the static and/or the dynamic route is performed on request.
 11. Method according to one of the preceding claims, further comprising the step of storing the static route on a non-volatile memory.
 12. Computer program product directly loadable into an internal memory of a digital computer, comprising software code portions for performing the steps of the method according to one of the claims 1 to 11.
 13. Computer program product stored on a medium readable by a computer system comprising computer readable program means for causing a computer to perform the steps of the method according to one of the claims 1 to 11.
 14. Navigation system, in particular for performing the method according to one of the claims 1 to 11, comprising
 - input means for inputting data;
 - data storage means for storing data, in particular a digitized map;
 - dynamic information receiving means for receiving dynamic information data;
 - data processing means for providing navigation information;
-

- outputting means for outputting navigation information, in particular optical and acoustical means;

wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map or by uploading a route and a dynamic route is determined based on static road information from the digitized map and dynamic information.

15. The navigation system according to claim 14, further comprising formatting means being designed to format the output of the navigation different for the static route and the dynamic route.
16. The navigation system according to claim 14 or 15, further comprising position detection means being designed to provide current position data and wherein the processing means are designed such that it identifies whether the current position of the navigation system is on the static route and/or the dynamic route or on none of both.
17. The navigation system according to claim 16, wherein the communication means are designed such that if the navigation system is on the static route static route navigation information is output and if the navigation system is on the dynamic route but not on the static route dynamic route navigation information is output.
18. The navigation system according to one of claim 14 to 17, further comprising comparing means being designed to compare the static route and the dynamic route and wherein the communication means are designed such that dynamic road navigation information concerning the differences is output.
19. The navigation system according to one of claims 16 to 18, further comprising comparing means to compare the static and the dynamic route, wherein the comparing means are designed such that, if the current position is both on the static route and the dynamic route, the following manoeuvre, based on the current position, of the static route and the dynamic route are compared and that the communication means are designed such that if the manoeuvre are different, navigation information concerning the dynamic route is output.

20. Vehicle comprising the navigation system according to claims 14 to 20.

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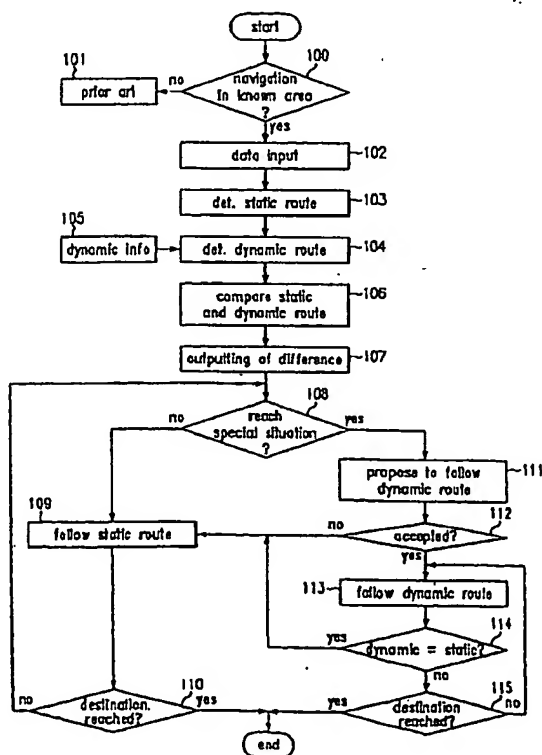
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[Continued on next page]

(54) Title: **NAVIGATION METHOD AND NAVIGATION SYSTEM**



(57) Abstract: The invention relates to a method to assist navigation in particular in regions the user of the navigation system is relatively well familiar with, comprising the steps of providing a digitized map, determining a static route based on at least two waypoints and static road information from a digitized map or by uploading a route, determining a dynamic route based on static road information from the digitized map and dynamic information and outputting navigation information. The invention is further directed to a navigation system comprising input means for inputting data, data storage means for storing data, in particular a digitized map, dynamic information receiving means for receiving dynamic information data, data processing means for providing navigation information and outputting means for outputting navigation information, in particular optical and acoustical means, wherein the data processing means is designed such that a static route is determined based on at least two waypoints and static road information from a digitized map or by uploading a route and a dynamic route is determined based on static road information from the digitized map and dynamic information.

WO 2005/001389 A1



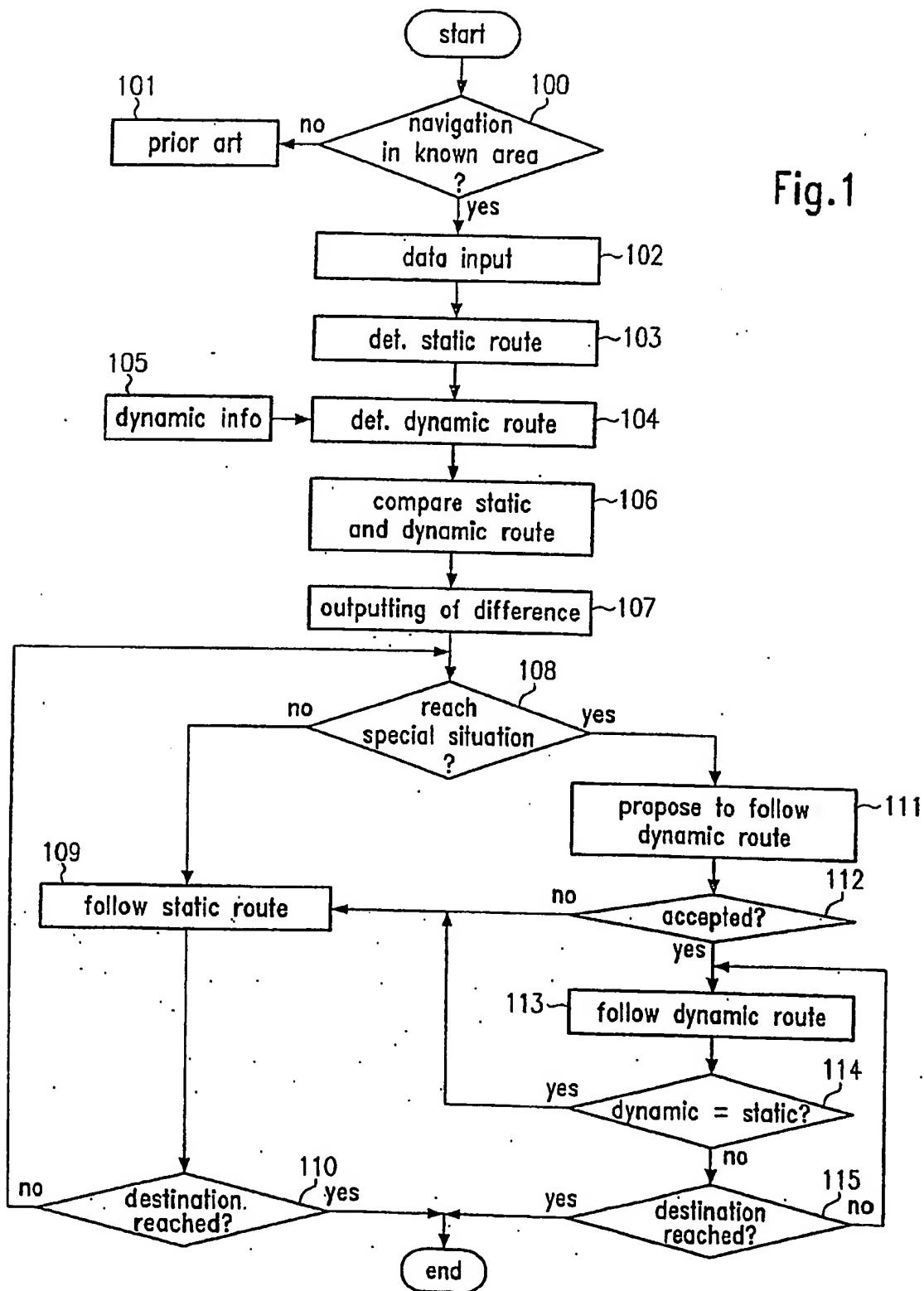
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Fig.1



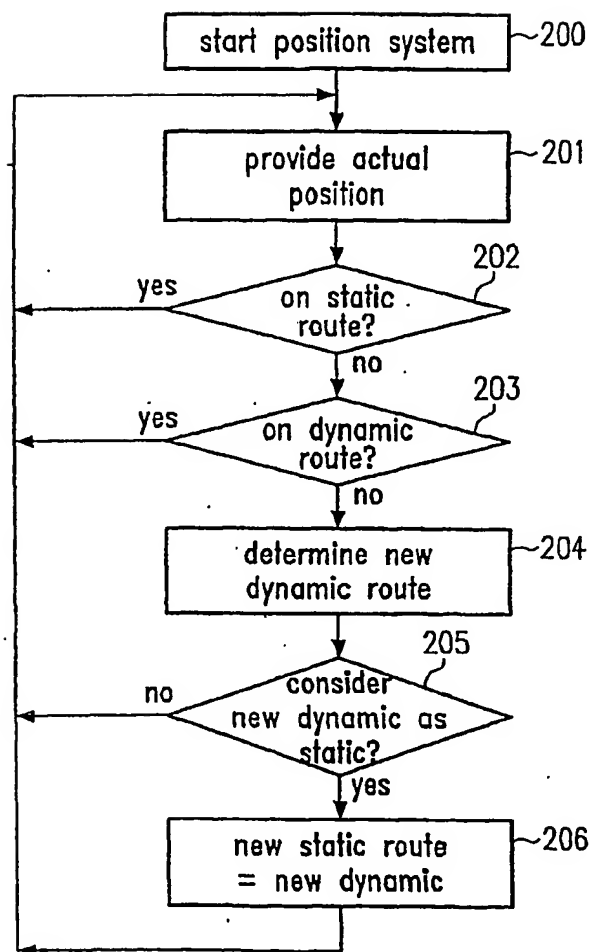


Fig.2

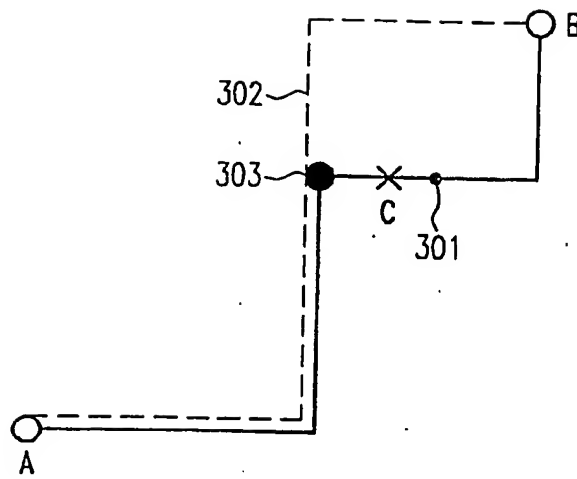


Fig.3a

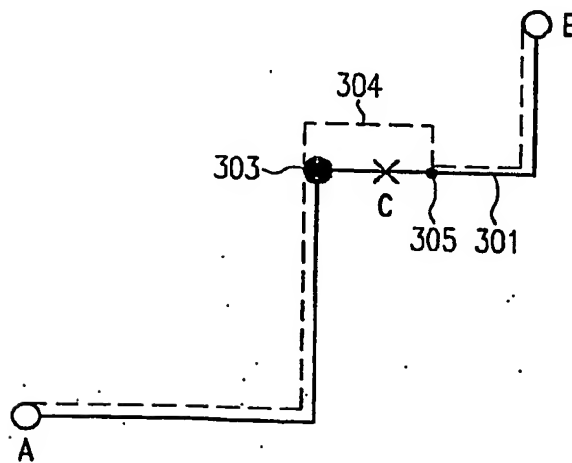


Fig.3b

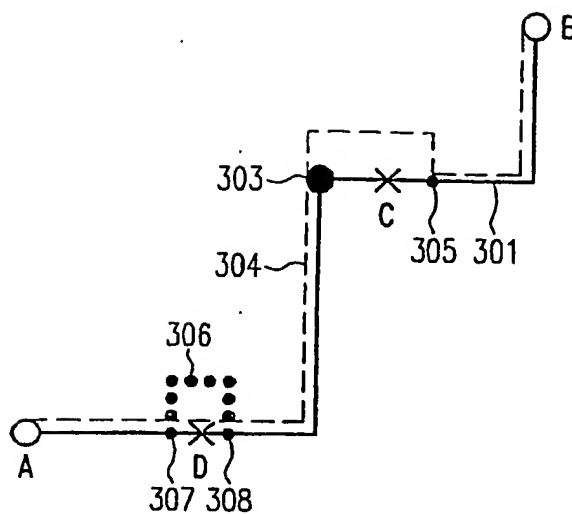


Fig.3c

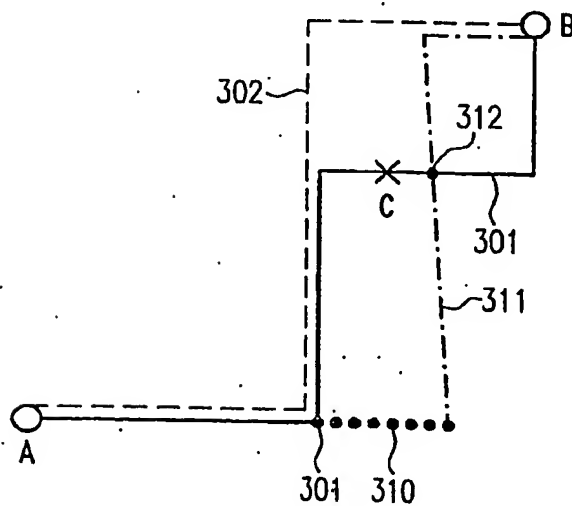


Fig.3d

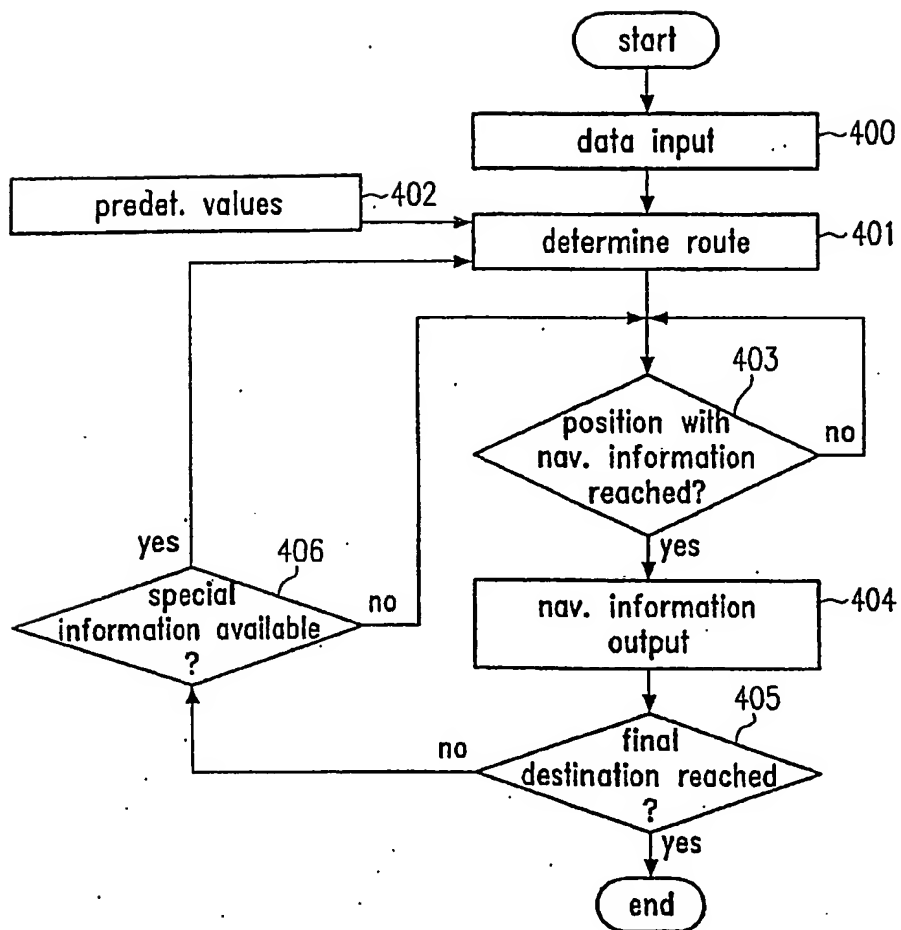


Fig.4

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| Taxe de renvoi Rücksendungsentgelt | 4.84 |
| Taxe de réexpédition Nachsendungsentgelt | 0.00 |
| Droits non postaux Nichtpostalische Abgaben | 0.00 |
| Divers Sonstiges | 0.00 |
| Total Insgesamt | 4.84 |

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| | | Fremd | <input type="checkbox"/> Fremde | Unbekannt | <input type="checkbox"/> Part. sans laissez |
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| | | Vermögens | <input type="checkbox"/> Vermögens | Ansprüche | <input type="checkbox"/> Ansprüche |
| | | Nicht | <input type="checkbox"/> Nicht | unbegrenzt | <input type="checkbox"/> insinuant |
| | | abgelehnt | <input type="checkbox"/> abgelehnt | | <input type="checkbox"/> Demerit |
| | | Nicht | <input type="checkbox"/> Nicht | | <input type="checkbox"/> Decrets |
| | | zulaß | <input type="checkbox"/> zulaß | | <input type="checkbox"/> Raison sociale |
| | | | <input type="checkbox"/> Non adm. | | <input type="checkbox"/> n'exist plus |
| | | | <input type="checkbox"/> Non adm. | | <input type="checkbox"/> Refusé |
| | | | <input type="checkbox"/> Non adm. | | <input type="checkbox"/> Non, r'adm. |
| | | | <input type="checkbox"/> Non adm. | | <input type="checkbox"/> Non adm. |

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